FOUNDRY TRADE JOURNAL

EST. 1902

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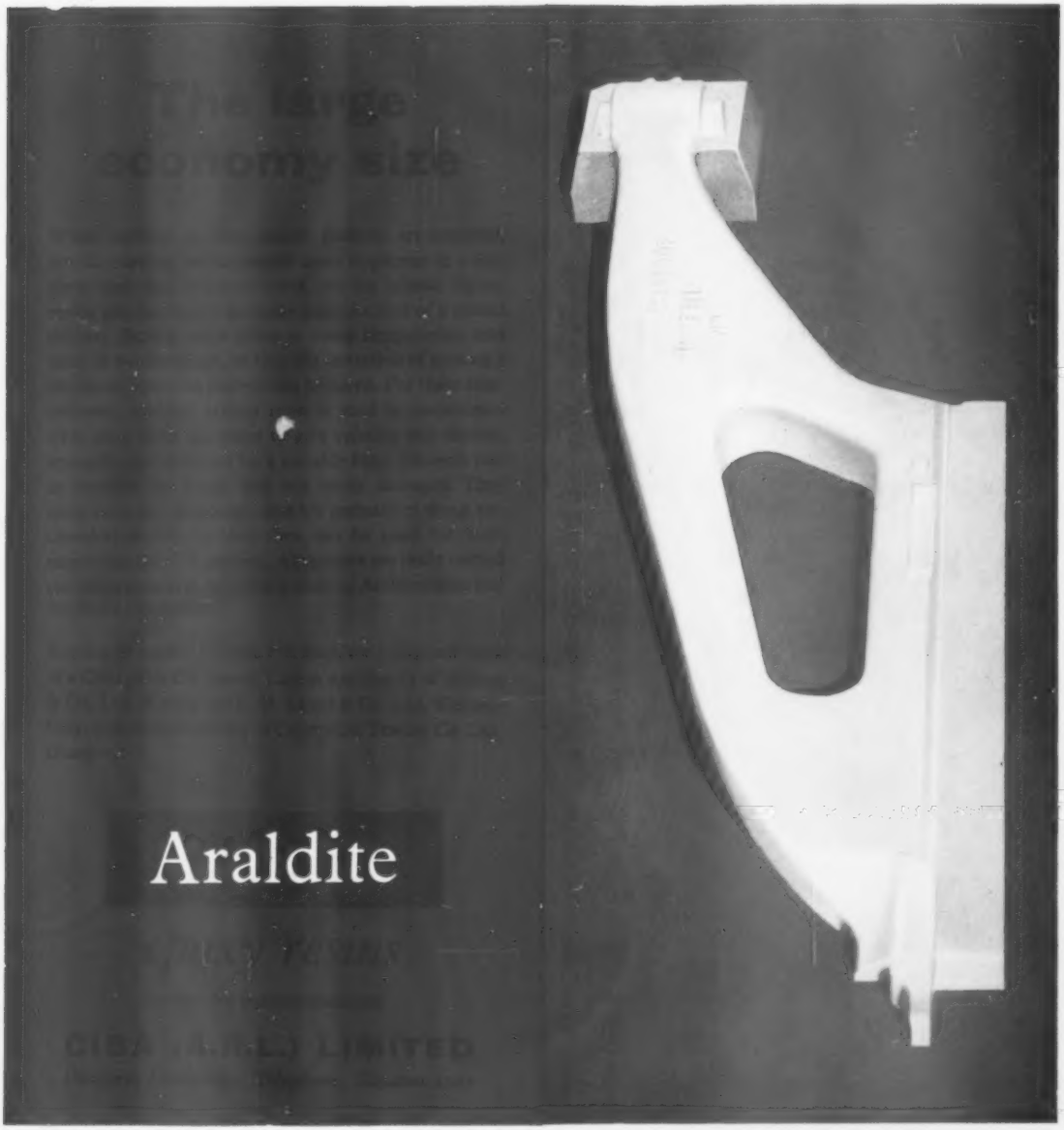

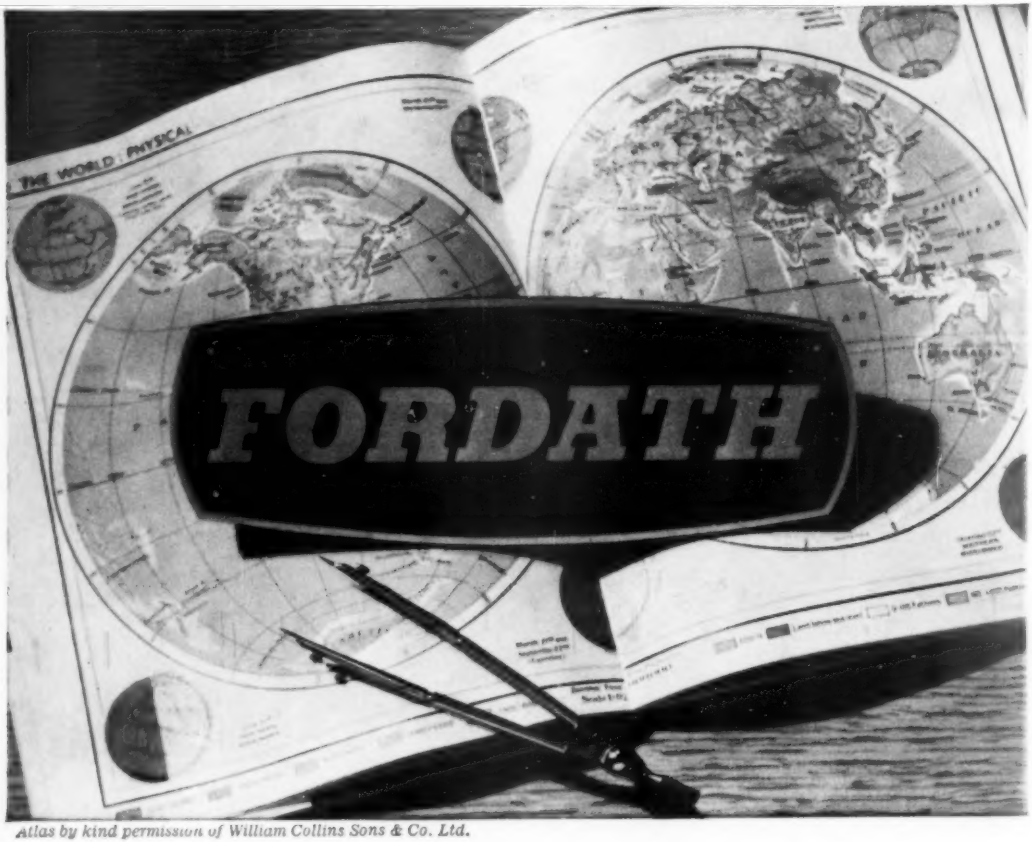

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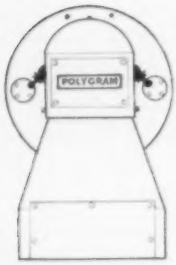
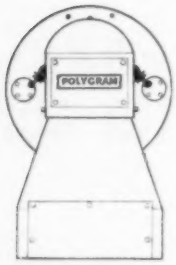
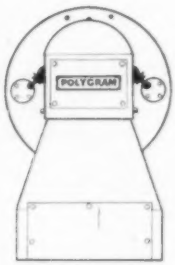


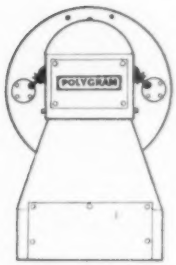
SHELL COREMAKING



SHELL MOULDING

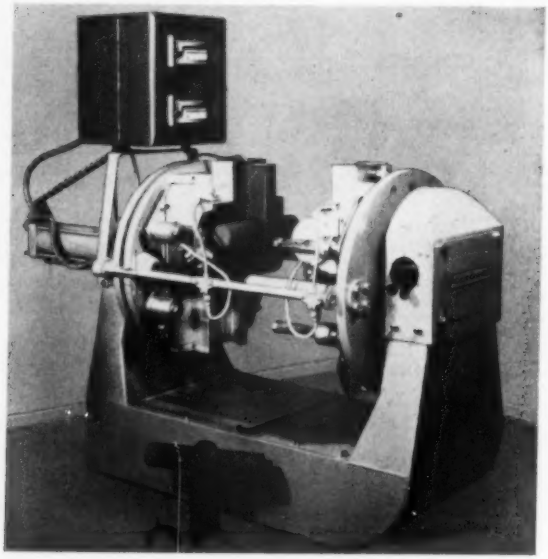


HOT-BOX PROCESS



GRAVITY DIECASTING

ONE . . . Polygram MANIPULATORS for SHELL COREMAKING



This shows a Manipulator in use with the latest Polygram column-mounted Coreblowing head.

Polygram Manipulators are the ideal method for handling large shell coreboxes (up to a maximum size of 28in. by 18in.) since they offer the following advantages:—

Full pneumatic operation from closing box to ejection of core
Automatic control of operation if desired
Temperature of each half of corebox electrically regulated within $\pm 5^{\circ}C$
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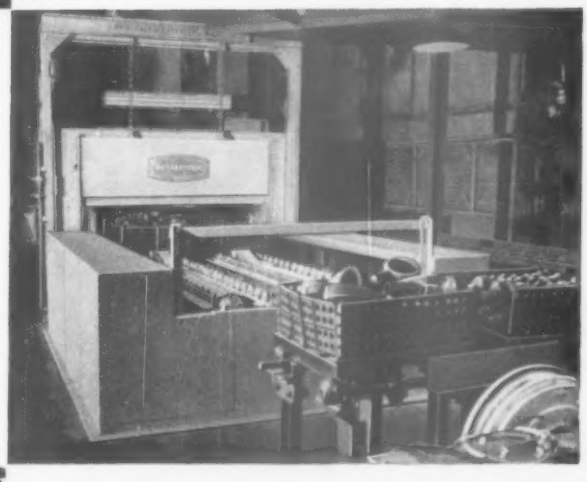
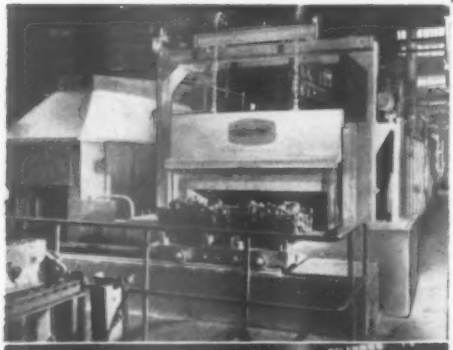
PEARLITIC AND FERRITIC MALLEABLE FROM THE SAME PLANT





Equipment for continuously producing ferritic and pearlitic malleable has been in operation for over four years, and the Metalectric plant installed at the Dagenham Works of The Ford Motor Co. Ltd., provides ample proof of the reliability of this form of annealing. The high degree of anneal coupled with ease in handling and the provision of a completely automatic plant emphasizes the consistency and uniformity of results which can be obtained by this process. Subsequent installations in the course of manufacture for Gloucester Foundry Ltd. and G.K.N. (Cwmbran) Ltd., include more up-to-date features, providing the latest form of continuous annealing.

Top: Charge end.
Upper left: Discharge end and return conveyor.
Lower left: Intermediate forced cooling station.

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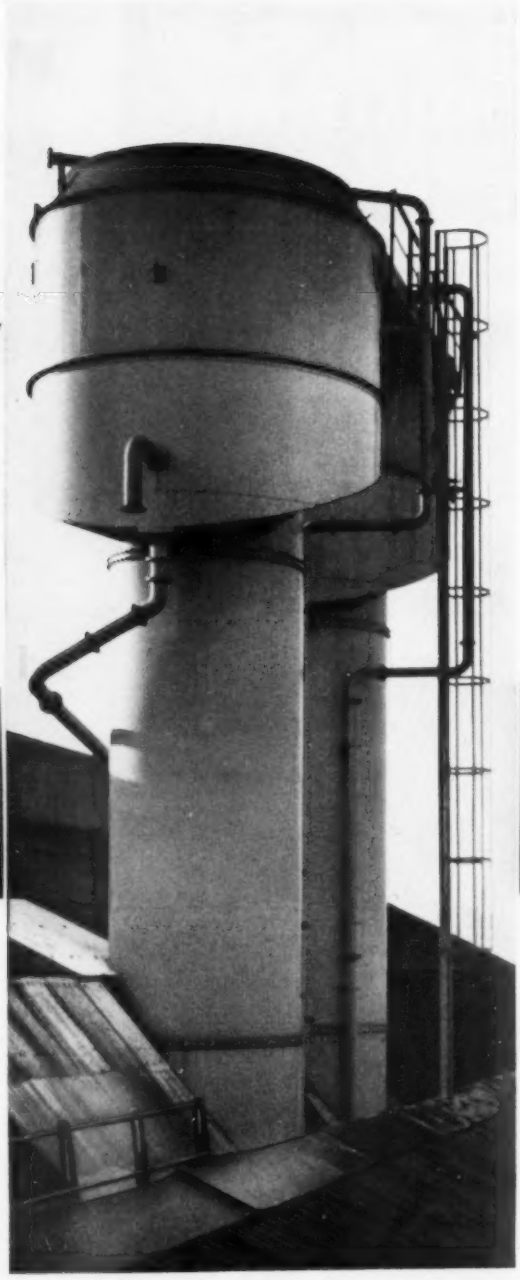
A

ROPER

Wet type

SPARK ARRESTERS



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Built in England by

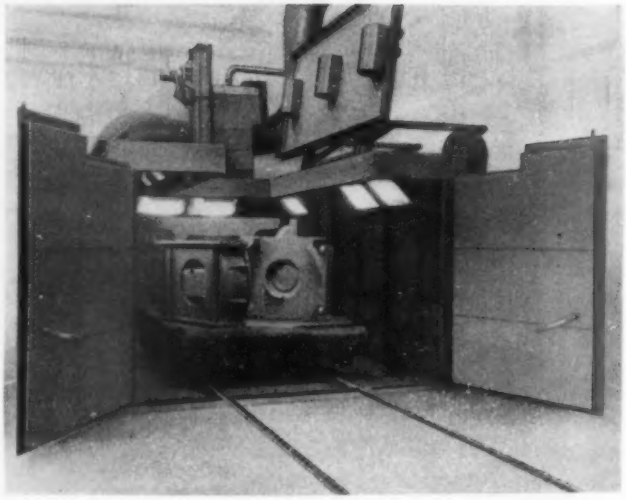
PNEULEC LIMITED, SMETHWICK, Nr. BIRMINGHAM

cut out for it ....

. . . Tilghman's shotblast & de-coring plants

Illustrated right is a Tilghman's Shot Blast and De-coring Room installation at Messrs. Walker Bros. (Wigan) Ltd. The installation is designed to create ultra-efficiency in the removal of sand, the provision of clean air, good working conditions for the operator and high blast power for removing sand from deep pockets.

Air curtains are provided ensuring complete visibility for the operator. A magnetic separator is also incorporated in the abrasive system, and dust, sand and foreign bodies are continuously removed ensuring that only cleaned useful abrasive is re-fed to the nozzle.



The waste sand is conveyed to a Sand Disposal Hopper, which is illustrated on the left, with a lorry in position to receive the waste sand load. Also illustrated is the latest Tilghman 'T' type filter tube dust collector, designed for high efficiency operation. For further details send for leaflet No. T.12R.

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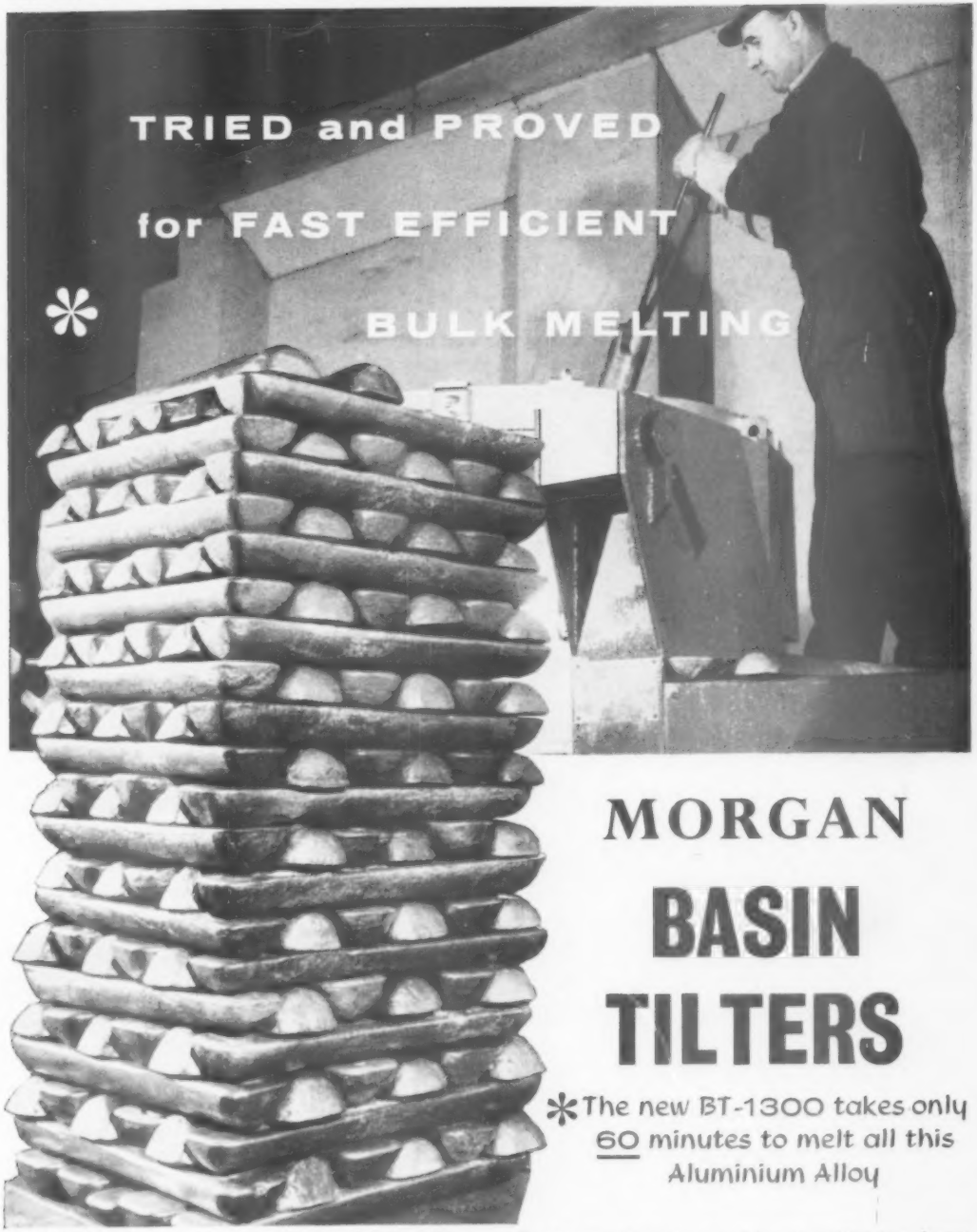

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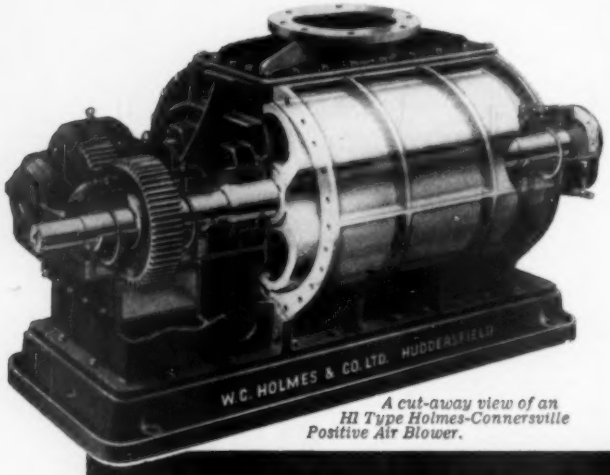
The Holmes-Schneible Multi-Wash System has been specifically designed to tackle dust and fume problems in foundries. This system, which is fully comprehensive and covers every phase of dust collection and control, comprises exhaust hoods, ducting, collectors, fans and de-watering equipment.

A Holmes-Schneible Multi-Wash Collector, Type "IC".



A cut-away view of an HI Type Holmes-Connersville Positive Air Blower.

HOLMES-CONNERSVILLE POSITIVE DISPLACEMENT BLOWERS

for Foundry Cupolas and Convertors.

Holmes-Connersville Positive Air Blowers have been designed to give continuous trouble-free service and are consequently of extremely sturdy construction. With a positive displacement blower of this type a constant volume of air, irrespective of pressure conditions, is assured.

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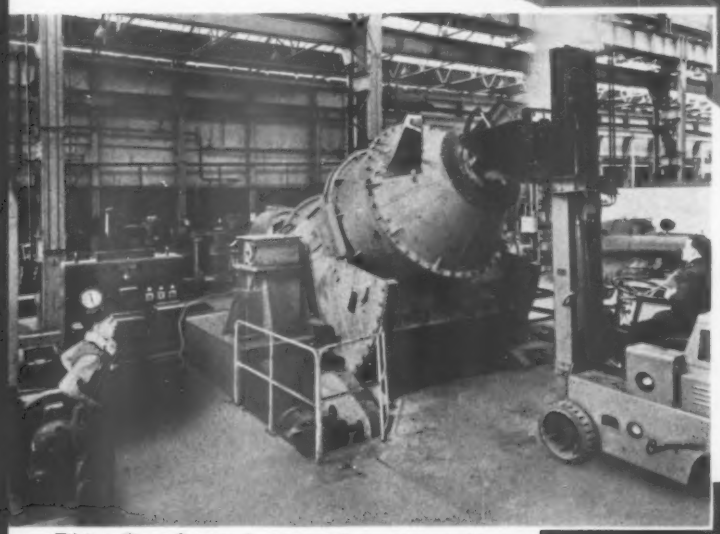

Tilting Type Rotary furnace reduces time and labour for charging. The furnace may be tilted to a vertical position for relining.

Furnace Capacities up to 10 Tons.

AUTOMATIC COMBUSTION CONTROL EQUIPMENT: THIS HIGHLY DEVELOPED SYSTEM CONTROLS OIL AND AIR BY WEIGHT AND AUTOMATICALLY COMPENSATES FOR DIFFERENCES IN BAROMETRIC PRESSURE AND TEMPERATURE THUS ENABLING ANALYSES TO BE ACCURATELY FORECAST AND MAINTAINED WITH MELTING LOSSES REDUCED TO AN ABSOLUTE MINIMUM.

ADVANTAGES OF THE OIL-FIRED ROTARY FURNACE

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- Flexibility of production.
- Simplicity of operation.
- High thermal efficiency.
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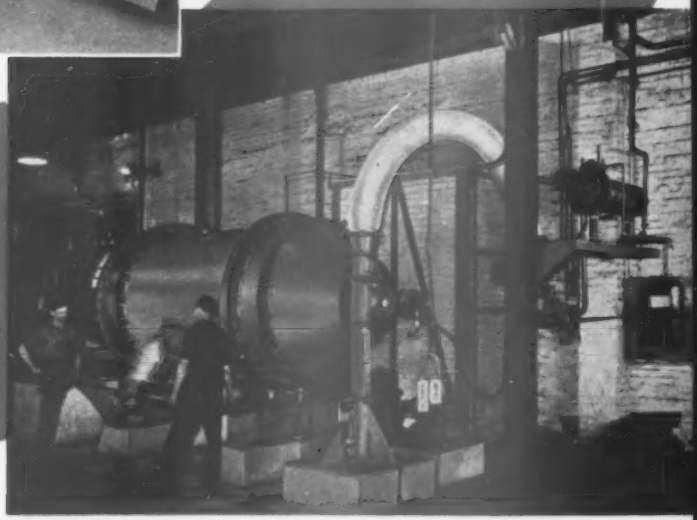

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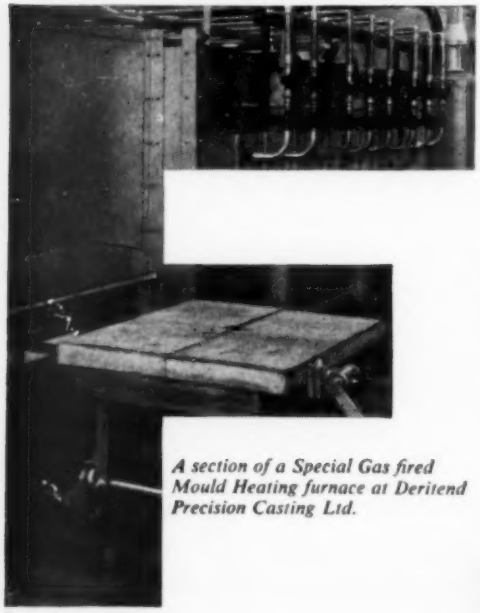

A section of a Special Gas fired Mould Heating furnace at Deritend Precision Casting Ltd.

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There's big savings in terms of dependability and easy maintenance when Franklin are called in on that furnace installation. Long experience in the supply of standard, and the design of special furnaces mean the snags are quickly ironed out. Furnaces fired by 'Dine' Burners give easy maintenance and fuel economy, that's why more and more well-known Companies are now counted as customers.
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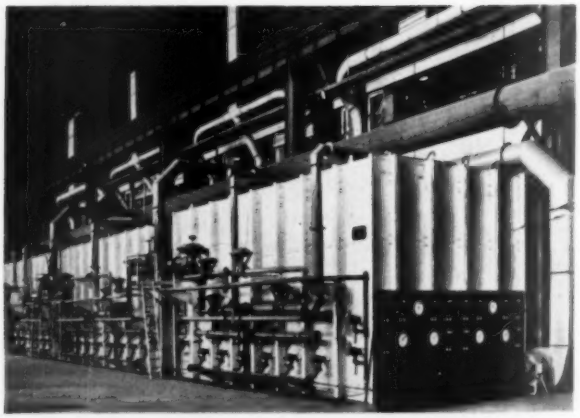

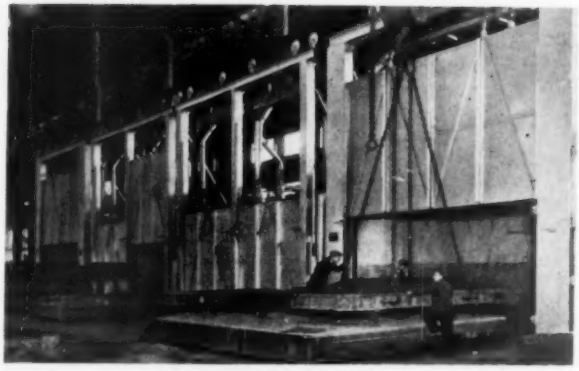

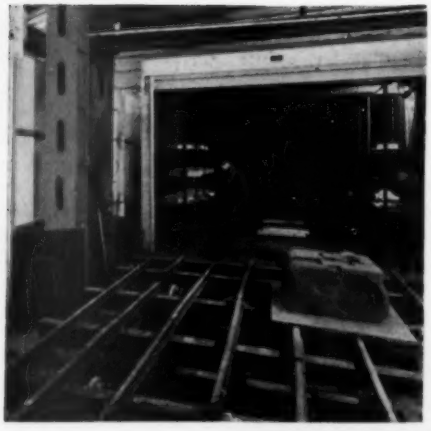

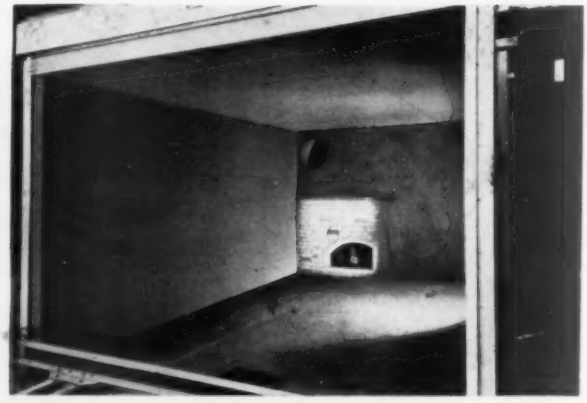

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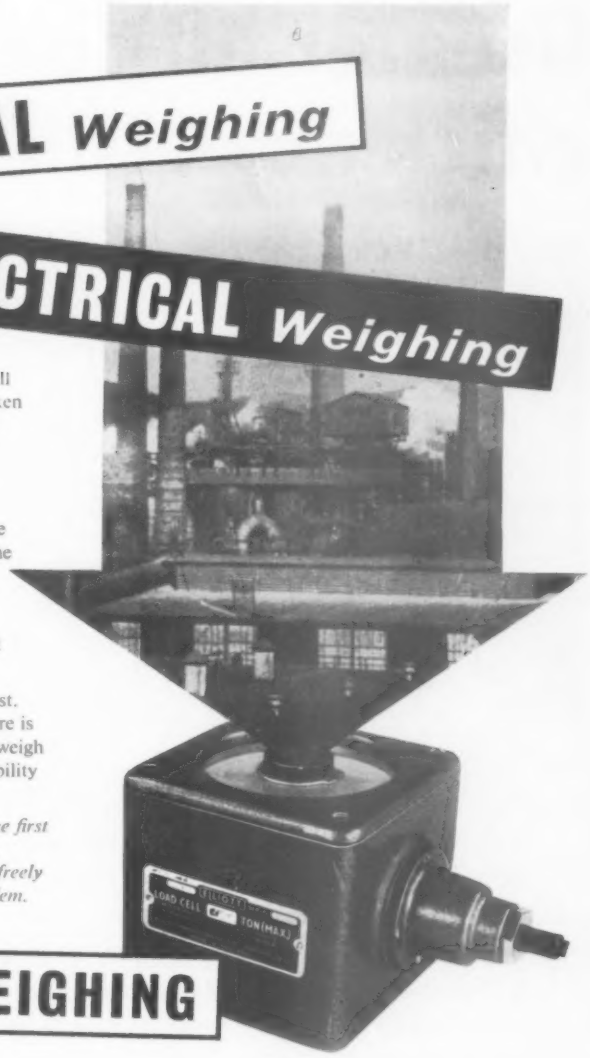

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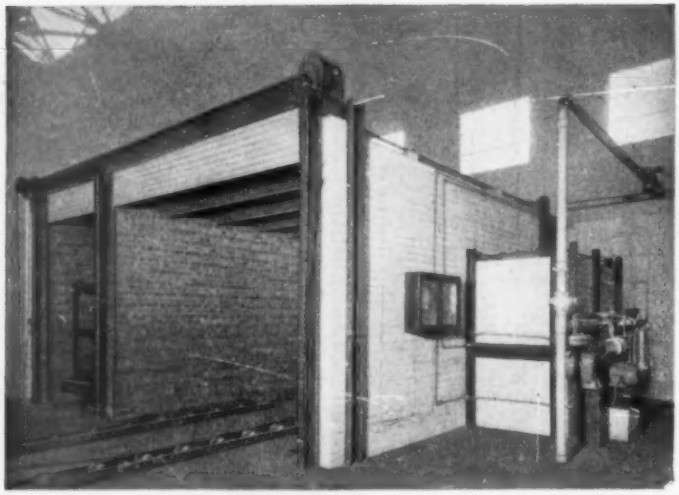

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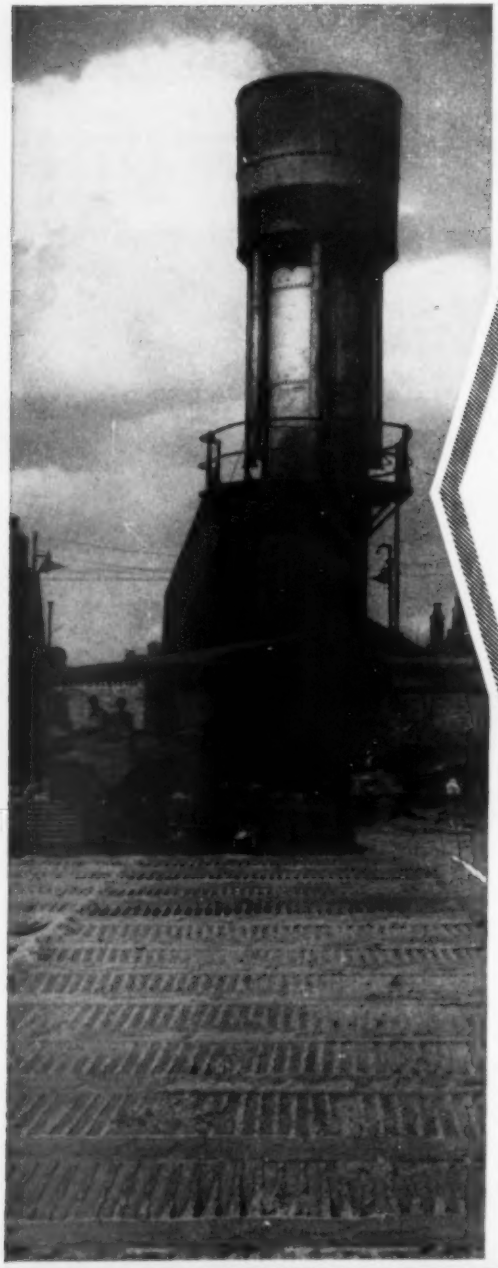

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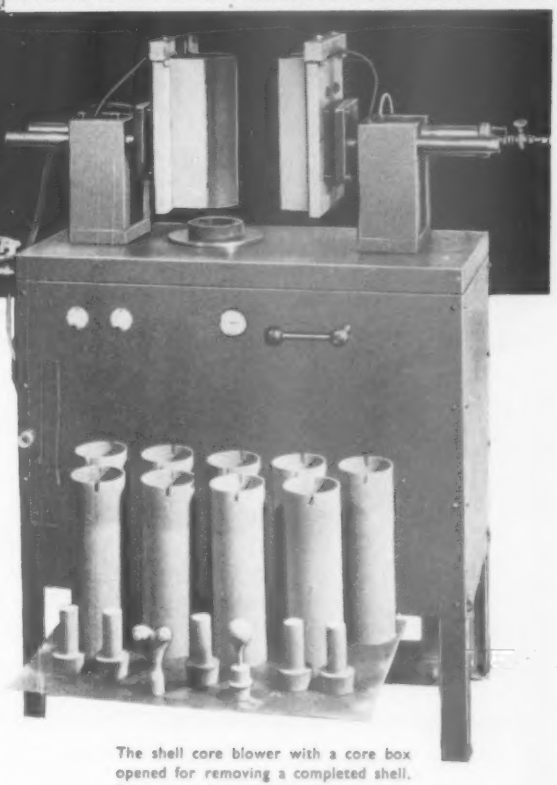
REYNOLDS

SHELL CORE BLOWER

The Reynolds Shell Core Blower, used with pre-coated resin sands, speeds production of high quality cores and reduces costs. The shells have only a fraction of the weight of solid cores and the saving in material and the elimination of mixing operations, more than offset the higher cost of resin bonded sands. Stronger cores are produced, special vents, supporting wires and driers are not required and the cores are ready for use immediately without further stoving. Storage life is considerably prolonged.



The shell core blower with a core box opened for removing a completed shell. Energy regulators, pressure gauge and control lever are mounted on the front panel. Some specimen cores are shown in front of the machine.

The core blower is of clean modern design, robustly constructed and suitable for use by unskilled operators.

FAME

FOUNDRY & METALLURGICAL EQUIPMENT CO. LTD.

QUEENS ROAD · WEYBRIDGE · SURREY

Weybridge 3891

Associated with Efco Ltd. and Stein & Akinson Ltd.

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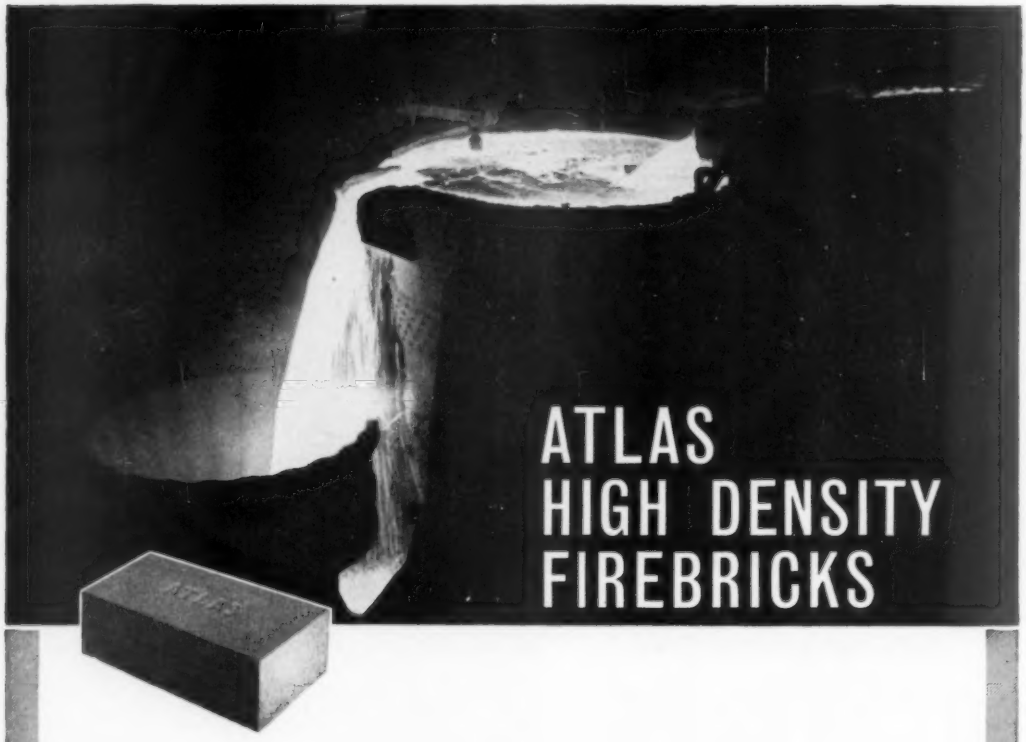

No firebrick can withstand high temperatures and heavy loads indefinitely.

But **ATLAS HIGH DENSITY** Firebricks have the maximum life possible under such conditions. They have been produced specifically for ladle linings and are quite unique in their performance in bottoms and the striking areas. High crushing strength and great resistance to penetration, erosion and abrasion have been combined to ensure a long working life.

Use **ATLAS HIGH DENSITY** Firebricks and line less often.

ILLUSTRATION

Tapping a furnace at Abbey Melting Shop, Steel Company of Wales Ltd. Ladle Bottoms are ATLAS Firebricks.

UNITED FIRECLAY PRODUCTS LTD

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REGISTERED OFFICE · 140 West George Street · Glasgow C.2

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for GRINDING

The GR Multi-Vane Grinder is compact, light, vibrationless and has a minimum of working parts. Fast cutting speeds on high tensile metals. 25 to 40% increased production with bakelite bonded wheels. A reliable tool.

for RIVETING

The AN80 is a heavy duty Riveting Hammer fitted with Sleeve Distributing valves, locking device and movable exhaust deflector. An excellent tool for foundries, workshops and general duties.

for CHIPPING

The DX5 Chipping & Caulking Hammers cover all normal requirements from heavy chipping to scaling. Designed for maximum performance, minimum air consumption and fatigue on operator.

for SCALING

This TSH¾ triple headed Scaling Hammer allows the operator to cover large areas quickly and economically. Effectively removes scale, rust, paint, etc.

Speed work — Cut costs with

"BROOMWADE"

Air Compressors & Pneumatic Tools

YOUR BEST INVESTMENT

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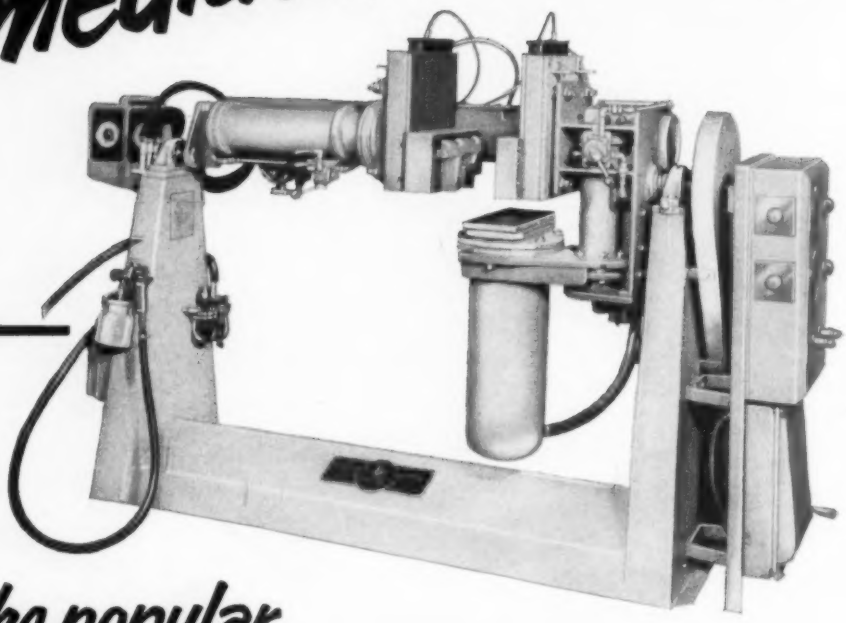

of the popular

SHALCO MCM 5

SHELL CORE BLOWER

Produces finished single or multiple cores, ready for setting in 30-50 seconds. Compact and complete in itself—no other equipment required. Investing and curing automatically controlled. Handling of hot core boxes eliminated. Any type of core can be blown in shell. Maximum box sizes accommodated: Model A 16″ x 15″, Model B 21″ x 15″.

STONE PLATT GROUP

THE COLEMAN WALLWORK FOUNDRY EQUIPMENT DIVISION OF STONE WALLWORK LIMITED

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The 'CLEAN AIR ACT' demands EFFICIENT dust and grit suppression

Instal...

TITAN

WET ARRESTERS

Designed by the principal Cupola manufacturers in the U.K. with more than 40 years experience and proven practice in all aspects of Cupola operation.

Many Foundrymen think Wet Spark Arresters are a recent development and because of troubles experienced with some installations, usually caused through bad design, they tend to regard them with suspicion.

We are proud that FORD MOTOR CO. selected **TITAN** Wet Spark Arresters for the **4 TITAN** 30 ton per hour Hot Blast Cupolas which we installed in their new Thames Foundry, the most modern in Europe.

These are illustrated, the second Cupola from the left is "blowing" —note the complete absence of dark smoke, sure proof of efficiency.

Photo completely untouched taken during normal operating conditions.

CONSIDER THESE ADVANTAGES

- **Reduce Maintenance or Replacement of Gutters, Drains and Roof Sheeting**
- **Protection of Paintwork, Roof Structures and Coatings, Glazing, etc.**
- **Eliminate Fire Hazards. It's worth approaching your Insurance Company!**
- **Improve Working Conditions in Adjacent Workshops Enamelling Plants, Offices.**

THE CONSTRUCTIONAL ENGINEERING CO. LTD

DESIGNERS & ACTUAL BUILDERS OF EFFICIENT FOUNDRY PLANT

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IT'S ALL AUTOMATIC . . .

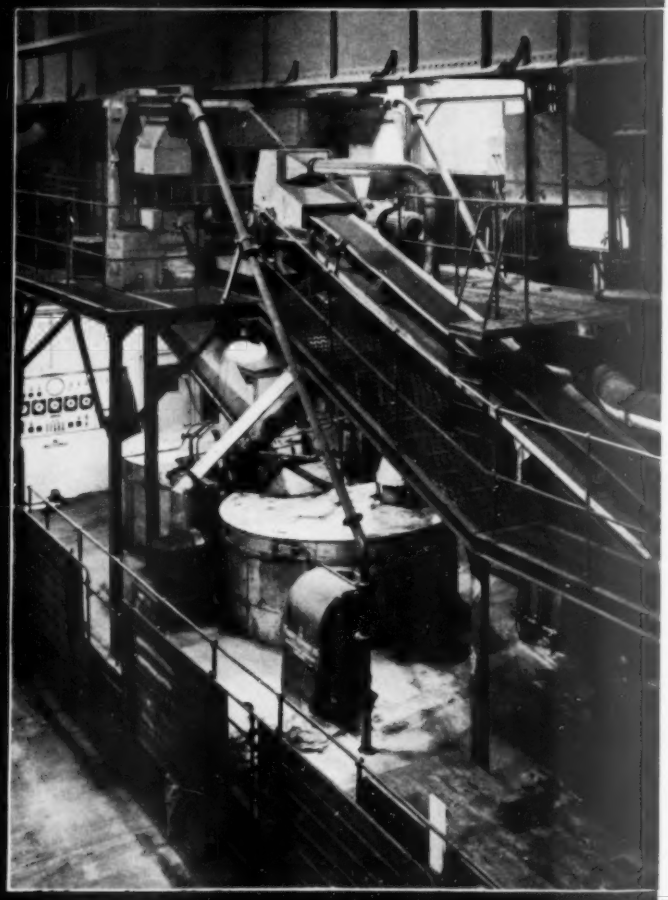
ENGLISH STEEL CASTINGS CORPORATION LTD.

GRIMESTHORPE WORKS
SHEFFIELD 9

We have been privileged to design and supply a 60 ton per hour Sand Conditioning and Distribution Plant to this famous Steel Foundry.

Plant incorporates 2 large Batch Sand Mills with the latest automatic weighing equipment for sand and additions (Bentonite delivered by tubular flight conveyor).

We can now offer what we believe to be the most advanced batch weighing system in the country — for easy mix, easy output, select your weighments set a dial and press a button it's all automatic!



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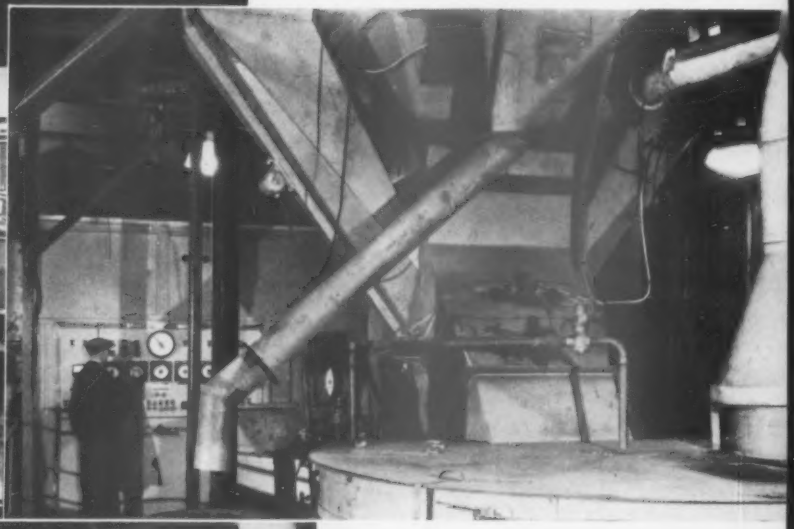
FOUNDRY EQUIPMENT LIMITED

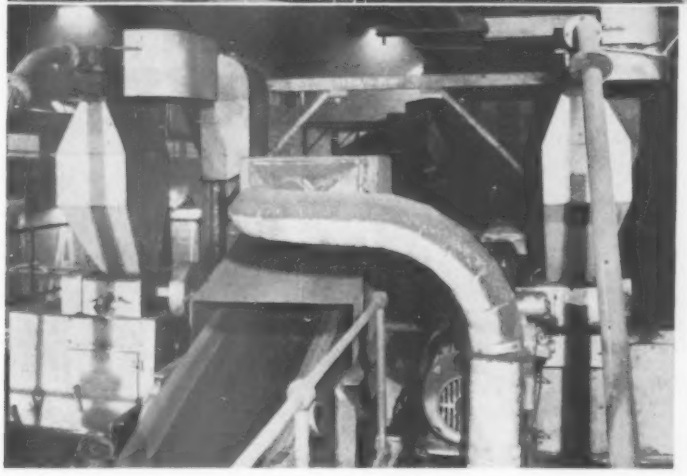
Leighton Buzzard, Bedfordshire, England

Telephone: Leighton Buzzard 2441 (5 lines) Telegrams: 'Equipment,' Leighton Buzzard, England

WEIGHING, BATCH FEEDING, MILLING, DISCHARGE, RESET

High precision weigh control for accuracy of mix, consistent sand quality and highest quality castings.





* *'English Steel' buy the best, how about you?*

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AUSTRALIA: Foundry Equipment (Australia) Pty. Ltd., Elizabeth, S. Australia.
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Write for Technical Bulletin No. 10

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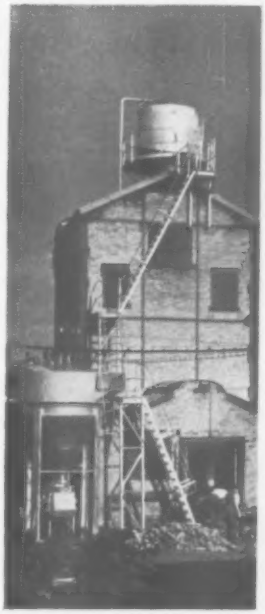
DUST...

Coarse as grit . . . fine as fume; if you want to control it, collect it, separate it, extract it, the people to get in touch with are Filter-Heat Ltd.

WHY?

For a very sound reason. They are not committed to any particular *method* of dust collection but are concerned with one thing only—the best way to trap a particular type of particle. It might be done with cyclones or multi-cyclones, cloth filters, wet collectors or reverse-jet filters —or a combination of these. Filter-Heat make them all. But for cupola emission they would install their water screen grit and spark arrester, similar to the one illustrated which is shown complete with its specially designed settling tank. They have also considerable experience in the design of hoods for the control and collection of industrial fumes, dust and grit. If you have a dust or grit problem ring them up—at Rugeley 138; Leigh, Lancs 72101 or (London) Abbey 3085. The name is . . .



The photograph shows a Filter-Heat grit and spark arrester which was recently installed in the Midlands.

FILTER-HEAT LTD

(a subsidiary of Sutcliffe, Speakman & Co. Ltd.)

33 MARKET SQUARE, RUGELEY, STAFFS.

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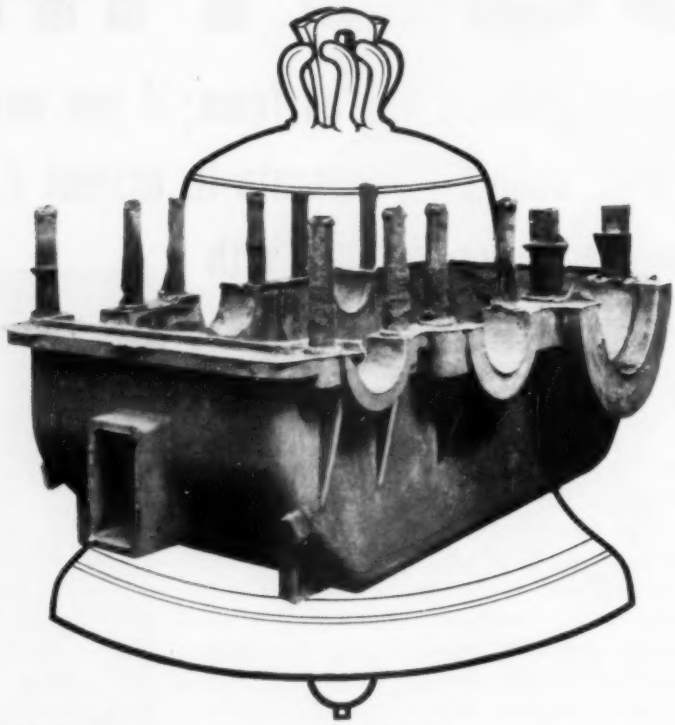
SOUND AS A BELL....

A PHRASE BORN IN THE EARLY DAYS OF FOUNDING NO DOUBT! AND IT HOLDS GOOD TODAY WHEN THE FOUNDER USES HARMARK CASTING AIDS.



THE CASTING ILLUSTRATED IS A TYPICAL EXAMPLE OF GOOD CRAFTSMANSHIP AIDED BY MODERN METHODS. THIS 4½ TON HALF GEAR CASING WAS PRODUCED WITH THE AID OF

HARMARK EXOTHERMICS

By The Dudley Foundry Ltd., Staffs.

INFORMATION LEAFLET NO. 17 FREE ON REQUEST.

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MANUFACTURED BY

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MOULDING BOXES & SHAKE-OUT MACHINES
in use in more than 9000 foundries
throughout the world
STERLING FOUNDRY SPECIALTIES LIMITED, BEDFORD, ENGLAND
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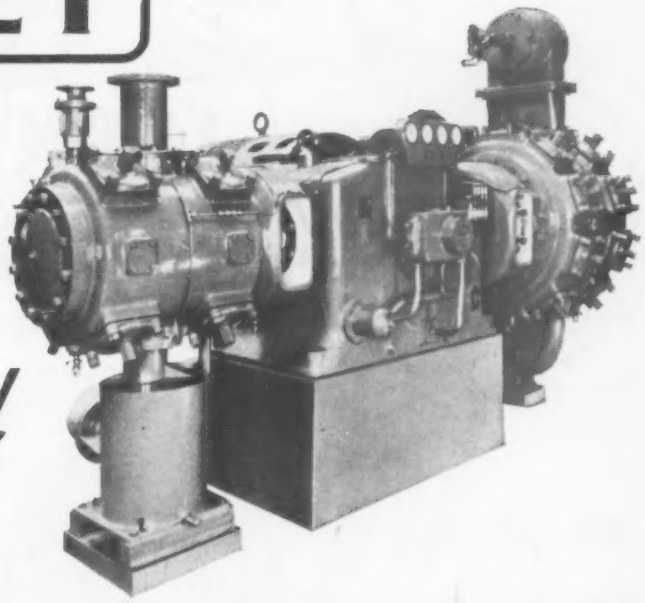
ALLEY



Balanced opposed

COMPRESSORS

are compact, fully balanced and vibration-free

Combining the known advantages of the horizontally opposed design with Alley's long experience of high-class compressor manufacture, the Alley balanced opposed unit is an attractive proposition wherever compressed air is required.

It is completely self-contained and totally enclosed; intercooler, oilcooler and motor are compactly built on. Being vibration-free it can be installed on minimum foundation, simply bolted down and is then ready to run.

SINGLE & TWO STAGE MACHINES
OUTPUTS TO 12,000 C.F.M.

A corresponding range of VACUUM PUMPS—DISPLACEMENTS TO 15,000 C.F.M.

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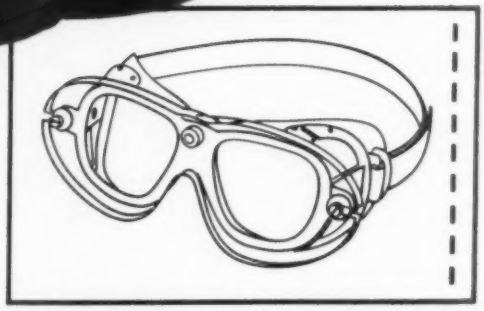
LOOK AT IT THIS WAY

This new concept in eyesight protection must revolutionise industrial safety methods

PARMELEE have now evolved a new design eye-protector which could well prove to be the solution to many problems of eyesight protection in industry. Briefly, the new eye-protector design consists basically of a standard frame in toughened plastic which fits snugly round the eyes with overlapping acetate windows fitted externally to the front providing all-round protection and allowing ventilation to a degree hitherto unknown. The front windows are instantly removable and replaceable and will be available in a range which covers virtually every type of industrial requirement. It is the work of a moment for the wearer to remove one window and replace by another suitable for the immediate job in hand. If you are in an industry which calls for protective eyewear, you can see this important new contribution to industrial safety at the RoSPA exhibition at Scarborough on *STAND NO.* 43. If unable to visit Scarborough please write for full details.



- Overlapping Acetate windows in a range to suit virtually all requirements, interchangeable in a second.
- Single or double windows with air space between, where extra protection is needed. Allowing super-abundant ventilation.
- Strong, comfortable, snug-fitting plastic frame.
- Side windows combine lateral vision with protection.

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STANTON low phosphorus foundry pig iron

This iron is machine cast and customers special requirements can be met within the limits of analysis shown.

It is particularly suitable for the Automobile Industry and for all High Quality Castings.

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	Total Carbon	3·4% min.
	Silicon	2·0—4·5% (in ranges of ·5%)
	Manganese	0·7—1·1%
	Sulphur	0·05% max.
	Phosphorus	0.25 % max.

TELEPHONE: ILKESTON 2161

A free and confidential metallurgical service is offered to customers in all aspects of foundry practice and technique.

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

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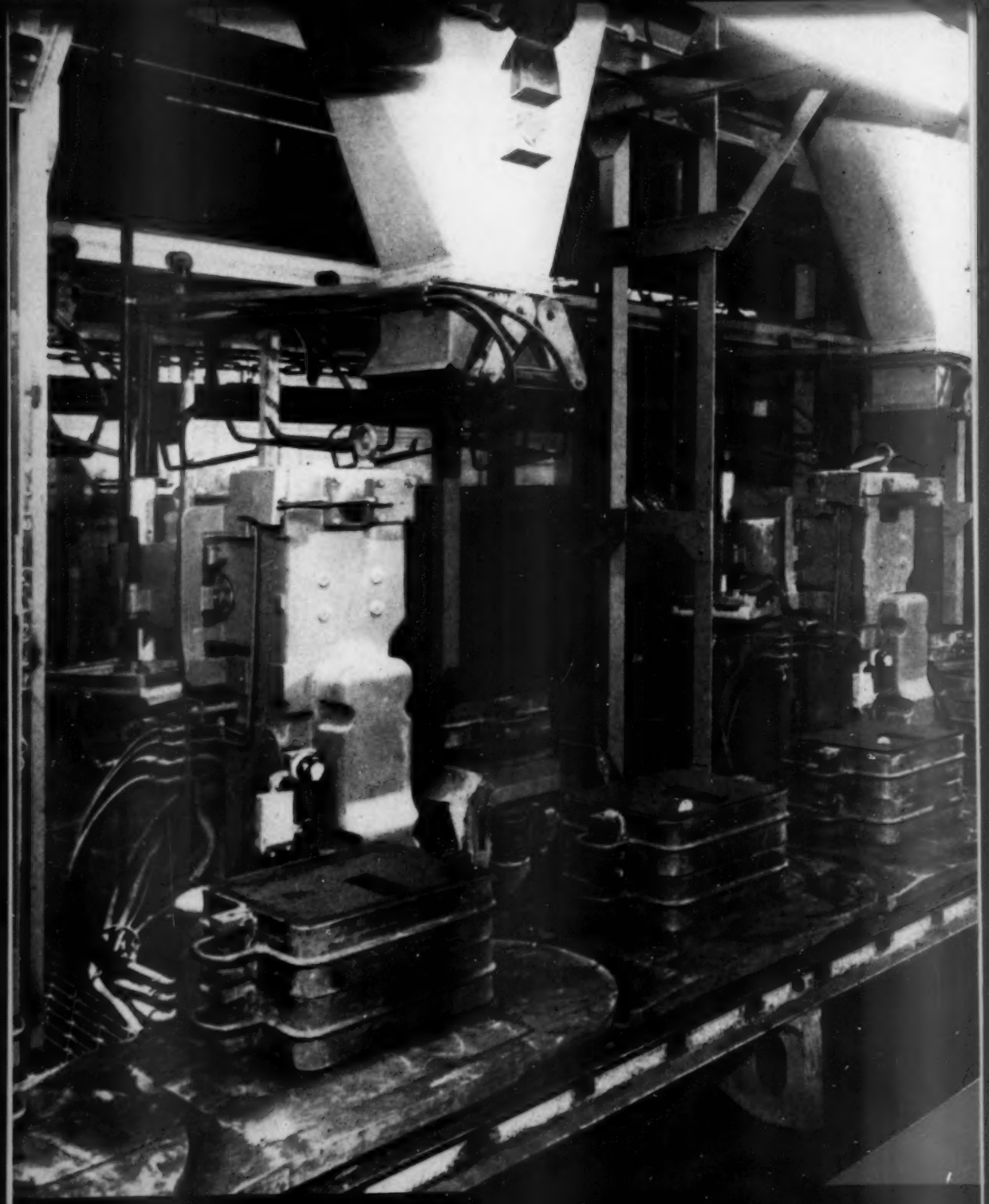

BRITISH MOULDING MACHINE CO. LTD.

Telephone: FAVERSHAM 2246/7/8

Automatic Moulding

in the modern mechanised foundry of

R. J. HUNT & SON LIMITED

specialists in the supply of high grade castings to the Automobile industry.

Six

B.Q.1 jaw-lift machines are installed in this latest section of Messrs. R. J. Hunt's foundry to be fully mechanised. Further B.Q.1 and B.Q.3 machines are in operation in other parts of the foundry.

B.Q. AUTOMATIC MACHINES

are raising the production figures in this and many other famous foundries. B.Q. machines are at once the FASTEST and most FLEXIBLE.

Entirely pneumatic. No electrics. No below ground foundations.

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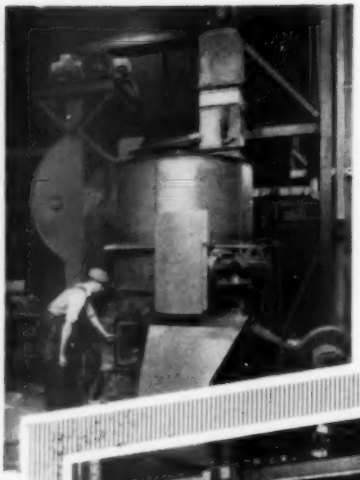
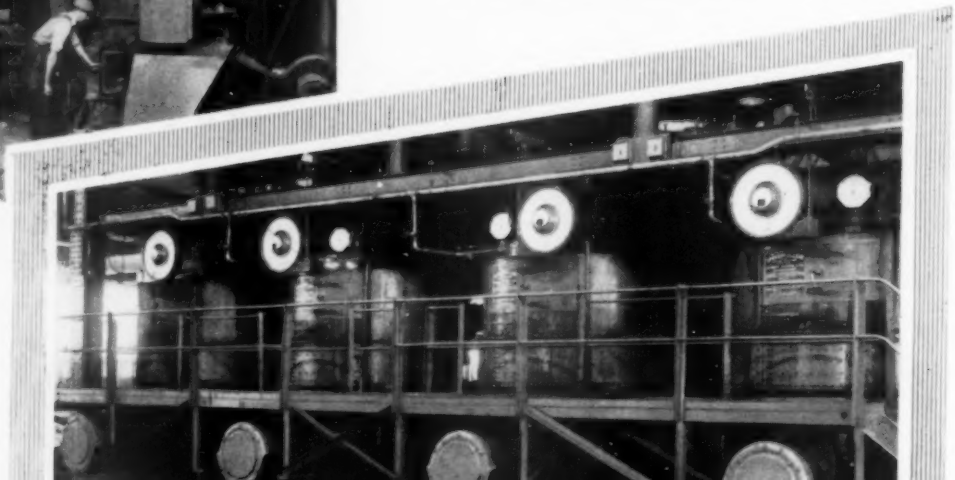


More and more modern foundries

are specifying the

SPEEDMULLOR

to mull their mould or core sand



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Entirely pneumatic. No electrics. No below ground foundations.

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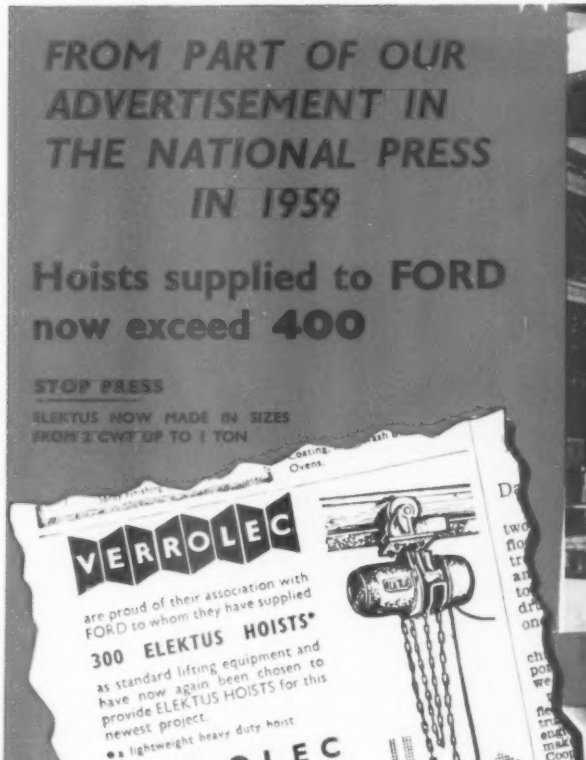
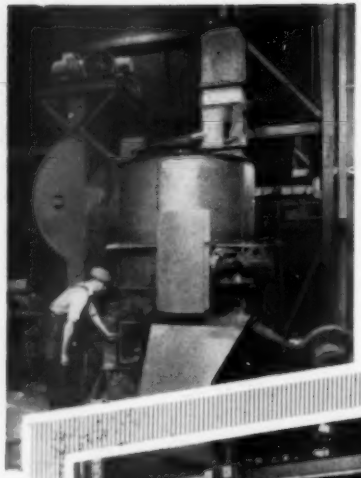
FROM PART OF OUR ADVERTISEMENT IN THE NATIONAL PRESS IN 1959

Hoists supplied to FORD now exceed 400

STOP PRESS

ELEKTUS NOW MADE IN SIZES FROM ½ CWT UP TO 1 TON


VERROLEC
are proud of their association with FORD to whom they have supplied
300 ELEKTUS HOISTS*
as standard lifting equipment and have now again been chosen to provide ELEKTUS HOISTS for this newest project.
* lightweight heavy duty hoist

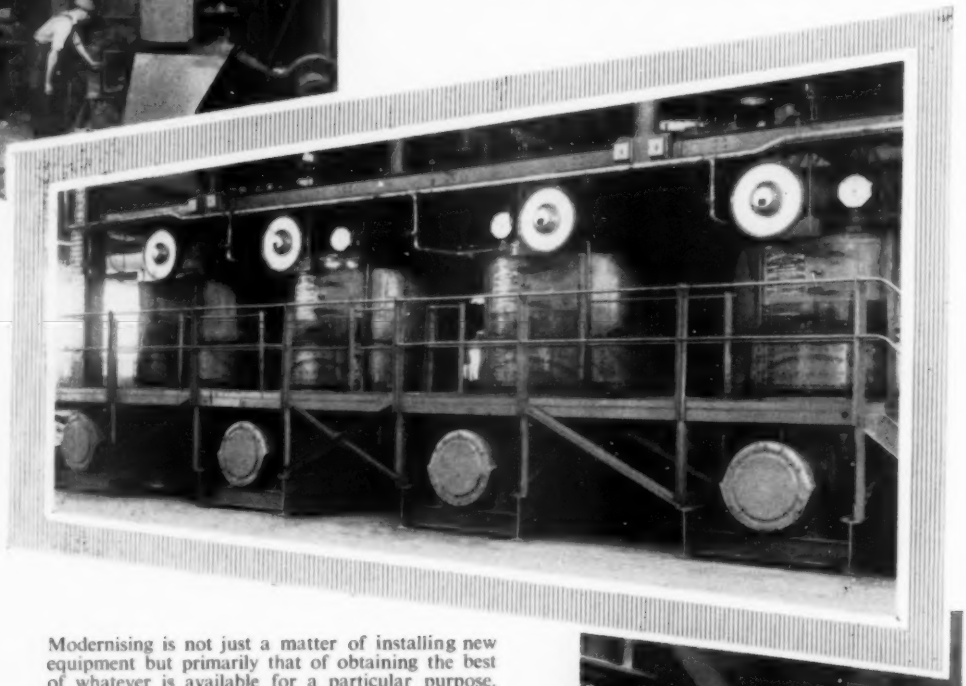


More and more modern foundries

are specifying the

*SPEED*MULLOR

to mull their mould or core sand



Modernising is not just a matter of installing new equipment but primarily that of obtaining the best of whatever is available for a particular purpose. That is why more and more modern foundries choose the Speedmullor for the preparation of their sand. One single foundry in this country operates 10 Speedmullors and one multiple company uses 14.

More foundry sand is mulled in Speedmullors than by any other method because, only Speedmullor mulling can develop the full physical properties of moulding sand and core sand mixtures with minimum bond and at lowest cost per ton of sand mulled. Full development of physical properties with maximum Speedmullor uniformity and control provides higher quality castings with better surface finish and the elimination of casting defects.

Made under licence from

BEARDSLEY & PIPER, CHICAGO

by

HERBERT MORRIS LIMITED

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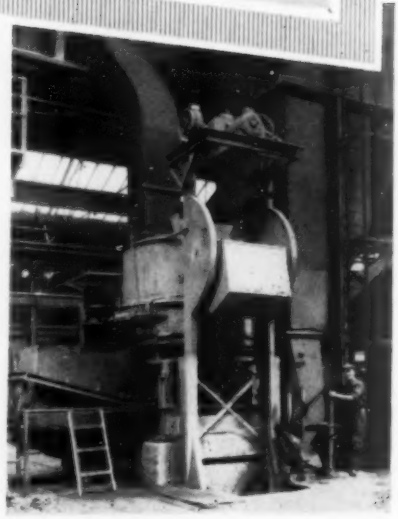

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ELEKTUS NOW MADE IN SIZES FROM 3 CWT UP TO 1 TON

VERROLEC
are proud of their association with FORD to whom they have supplied
300 ELEKTUS HOISTS*
as standard lifting equipment and have now again been chosen to provide ELEKTUS HOISTS for this newest project.
*a lightweight heavy duty hoist
VERROLEC
provides the
UNUSUAL
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THE FORD STORY

We also supply:—

FOUNDRY MOULDING M/Cs. SHELL MOULDING M/Cs.
JOLTERS
SAND SLINGERS
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VIBRATING SCREENS
SAND DRYERS
ANGLE GRINDERS
DOYLE 'POWER' RAIL FOR MOULD TRANSPORTERS
HOISTS, CRANES, HF & STANDARD POWER TOOLS
AIR COMPRESSORS, PNEUMATIC RAMMERS
AND POWER TOOLS

VERROLEC LTD.

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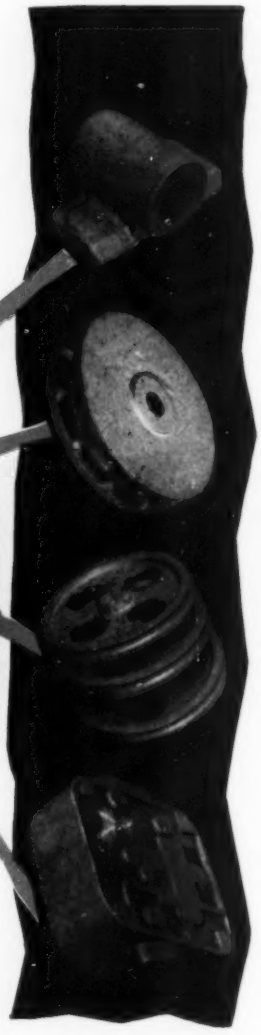
ONE MAN AND HIS CENTRIBLAST

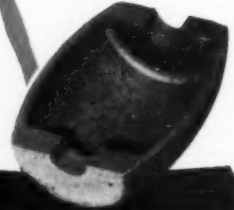
AIRLESS ROTARY BARREL CLEANING MACHINE



. . . in only one hour can thoroughly clean one ton of miscellaneous castings — no wonder they say CENTRIBLAST CLEANS FAST!

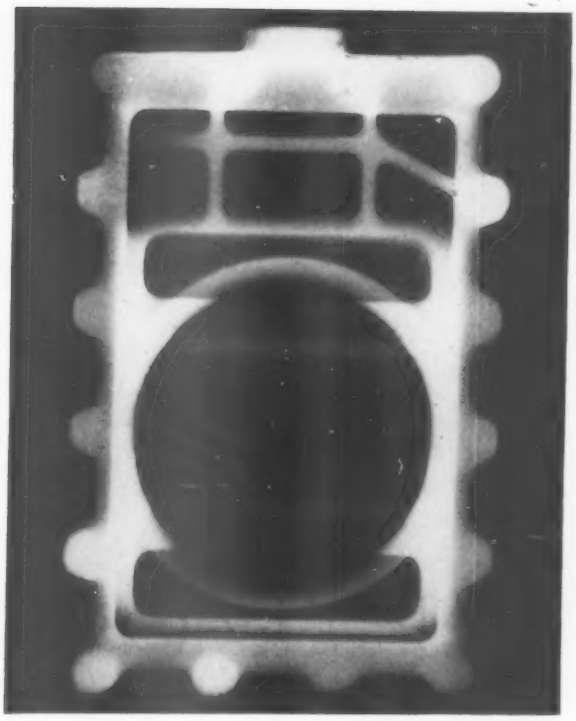
Not only fast and thorough—the airless Barrel Centriblast has other vital advantages too . . . built-in desilter . . . efficient general dust control . . . low power consumption . . . slow speed of rotation . . . and of course no compressed air whatsoever.

The Barrel may not do your job, but there's a Centriblast machine that will! Tell us the job and we'll tell you which!



SPENCER & HALSTEAD LTD BLAST CLEANING DIVISION OSSETT YORKSHIRE

Powney/S. 31



Where sections vary greatly . . .

. . . 2 films are better than 1

ILFORD technicians pioneered multiple film technique in industrial radiography. This has been graphically described as a "sandwich" of two or more films, and the technique gives vastly superior results where specimens with widely varying densities have to be critically examined.

The "sandwich" consists of two or more films of different speeds loaded into a standard cassette for simultaneous exposure. Thick sections of the specimen register clearly on the faster film, and the thinner sections on the slower film. The effects of differential exposure can be accentuated by using lead screens in the "sandwich". The technique can also be used for making duplicate radiographs by using two films of the same speed.

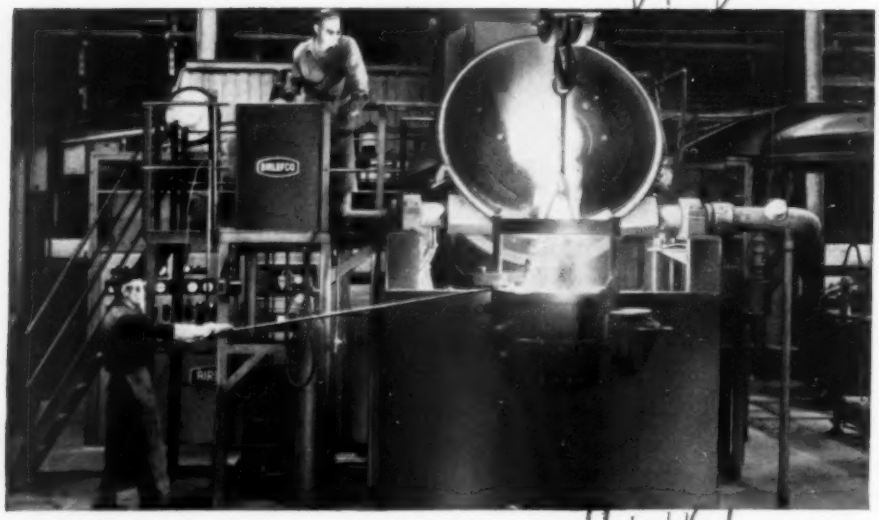
Choice of the appropriate ILFORD Industrial X-ray films obviously depends on the subject, the tube voltage and the presence or absence of screens. Full details of film choice and voltages, as well as lead screens, will be forwarded by request.

For improved radiographic examination

ILFORD INDUSTRIAL X-RAY FILMS, CHEMICALS, CASSETTES AND LEAD SCREENS

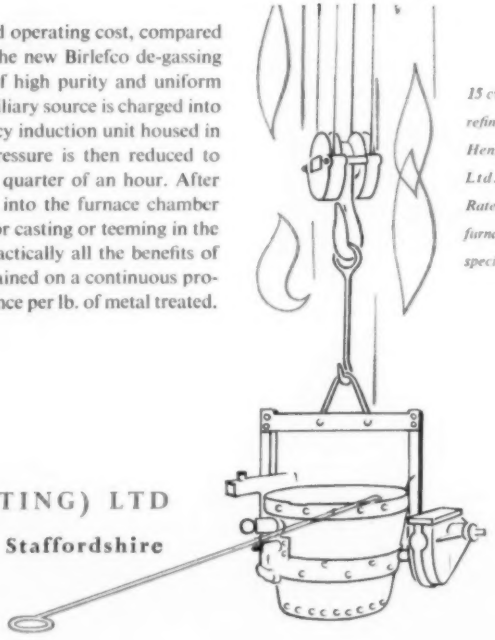
ILFORD LIMITED · ILFORD · ESSEX

VACUUM REFINING of MOLTEN METAL



Birlefco advance in vacuum technology

At a considerably reduced capital and operating cost, compared with conventional vacuum melting, the new Birlefco de-gassing and refining furnace ensures metal of high purity and uniform properties. Molten metal from an auxiliary source is charged into the furnace, which is a mains frequency induction unit housed in a tiltable vacuum tank. Chamber pressure is then reduced to about 250 microns and less within a quarter of an hour. After vacuum treatment air is re-admitted into the furnace chamber and the metal is poured into a ladle for casting or teeming in the conventional manner. In this way practically all the benefits of induction vacuum melting can be obtained on a continuous production basis at a cost of only a few pence per lb. of metal treated.



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FOUNDRY TRADE JOURNAL

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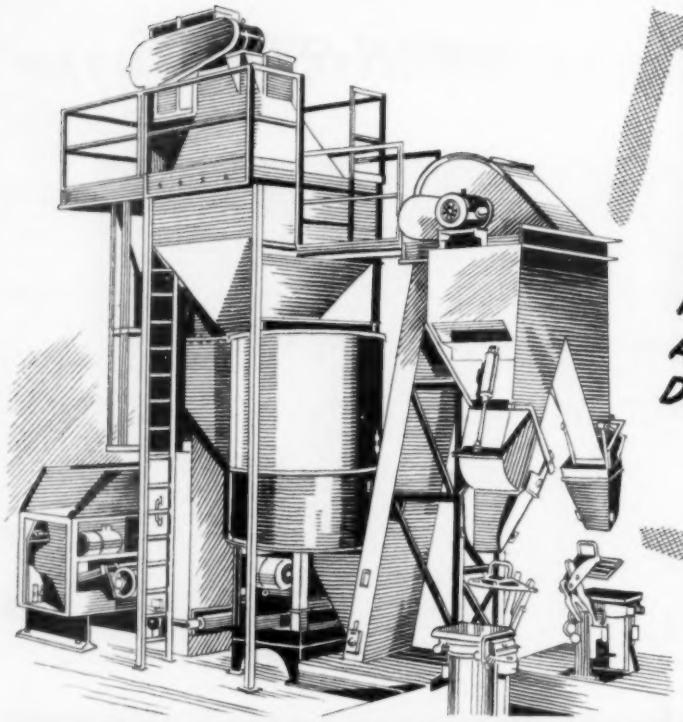

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FOUNDRY
TRADE JOURNAL

Vol. 110 May 11, 1961 No. 2318

Release the Chokes!

A somewhat "shaggy" motoring story may serve to draw attention to Rip Van Winkle attitudes of mind unfortunately prevalent amongst a large number of founders: A car driver, because of a temporary disability, was driven to the station by his wife—a quite unprecedented occurrence. Arriving there, diplomatically he congratulated her on skilled manoeuvring; "but why the little fiddle with the choke control at the start?" he asked. "What a poor memory you've got," replied the wife indulgently. "When you taught me to drive, did you or did you not insist that I must release the choke gradually at one-minute intervals?" "I do remember," my dear, he said, "but that was thirty years ago, and cars and controls have changed since then!" Ever chivalrous, we hasten to add that it is not only lady drivers who slavishly follow outworn rituals. Male drivers do, too, and quite a lot of foundrymen own cars!

Point was given to allegations of stagnant thinking at a recent one-day conference* in York organized for members by the British Steel Castings Research Association. On the subject of "Work Simplification," it dealt in a comprehensive manner with any or every way of making foundrywork easier, discarding rule-of-thumb methods and my-father-did-it-that-way practices. The essence of a work-simplification programme is that after short basic training, a nucleus staff—or, maybe, a single observer with an inquiring mind—can begin to pick out quite ordinary jobs that are capable of improvement, the latter following upon study and analysis. Similarly, foundry layouts can be tackled, and one of the conference papers, for example, detailed the very worthwhile re-arrangement of a steelfoundry coreshop. It is clear that reducing the labour content of jobs, and this applies particularly to "service" departments, can result in substantial savings—economies that translate themselves quite quickly into cash and better productivity. That all three groups, shareholders, workpeople and customers, should benefit from work simplification was the view expressed by Mr. A. W. Syme, attending the conference to express the Department of Scientific and Industrial Research's backing for such projects. Increased productivity arising in this way can be three or four times that obtained by "stick" or "carrot" methods, he stated. As an observer, a member of the British Cast Iron Research Association's "Foundry Operations Section" added comment to support the four papers presented at the conference and in doing so revealed much community of ideals (and many common problems) which ironfounders have with steelfounders.

It was left to the conference chairman, Mr. M. C. Lloyd, to sum up the proceedings. "To do or not to do" was the question he posed to the delegates, answering it with: "Can we afford *not* to adopt work-simplification techniques." We realize the ideas expressed at the conference are not new, but their adoption as a "religion" to be followed enthusiastically by staff within a foundry is a novel conception, capable of bringing enormous improvement. Rightly propagated, such an attitude of mind on the part of a work simplification team could be infectious to the extent of making the foundry's whole staff and workpeople into crusaders. We believe there is plenty of scope for such activity. The Steel Founders Research Association are to be congratulated on fostering such methods amongst members; we would like to see more conferences of this sort, together with more "stimuli" applied by BCIRA operational teams and more agitation by enlightened non-ferrous founders. It is high time the "chokes," represented by obsolete methods and thinking, were swept away wholesale from our industry.

* The whole conference proceedings are shortly to be surveyed in this JOURNAL.

Bowmaker's New Headquarters

Sir Arthur Morse, chairman of Bowmaker, Limited, formally opened the new headquarters building of Bowmaker (Plant), Limited, at Cannock on May 2. The company has moved from its former premises at Willenhall to a site four times as large as the previous one. At the new Cannock factory, the most up-to-date facilities have been installed for fitting out the company's earth-moving equipment, for servicing it, and for the rebuilding of used vehicles.

As can be seen from the illustration, the service department has a Silberkuhl roof, of German design, by which a series of latticework steel arches span the width of the work area carrying shells of reinforced concrete. Another interesting feature of the new premises is the large open office in which all staff, including Mr. L. R. Stokes, the managing director, are located in one room which covers 7,200 sq. ft.

Bowmaker (Plant), Limited, which, in 1950, was appointed to administer sales and services of the Caterpillar Tractor Company of Peoria, Illinois, USA, is also establishing new premises at Cardiff, which are expected to be in operation by July. Another plant is being set up near Exeter. The design of the Cannock premises which have covered floor space amounting to 91,250 sq. ft., is such that easy extension will be possible when required. The present building stands in 13¼ acres, with an imposing frontage to Watling Street. Within the building are four separate units all interconnected and contained within three main blocks. Internal colour schemes are mainly off-white, with the structural members in the service and parts departments picked out in bright colours to contrast or harmonize with the yellow of the company's Caterpillar machines and parts.

HADFIELDS, LIMITED, East Hecla Works, Sheffield, have offered to present to the City of Sheffield a piece of silver for the Corporation's collection. The choice of the presentation piece is left to the City Council, with the hope that it could be designed and made by Sheffield craftsmen. The Advisory Committee of the Sheffield Lord Mayor has recommended that the offer be gratefully accepted and propose that competitive designs should be invited from Sheffield designers and artists. An award of 10 guineas will be made to the author of the accepted design.

Italian Patternmakers' Visit

The National Society of Master Patternmakers has now completed its arrangements for the visit of the Italian Master Patternmakers and their ladies to this country (previously reported in the JOURNAL, March 23) and details of the programme are as follow:—

The Italian party will be met by members of the NSMP on their arrival in London on Monday, May 29. On the Tuesday they will travel to Leicester for a morning visit to the works of Wadkin, Limited, and after luncheon in Leicester, the party will go on to the works of the Leamington Patternmaking Company, Limited, at Leamington Spa, returning to London in the evening.

A visit to the National Science Museum in Kensington is scheduled for the Wednesday morning, followed by luncheon at the Charing Cross Hotel. In the afternoon there will be two further works visits, the first one to B. Levy & Company (Patterns), Limited, and the second to R. J. Frankiss, Limited. On the Thursday morning the party will leave London by coach *en route* for Birmingham where they will tour the works of Crockett Lowe, Limited, in the morning, and in the afternoon, those of Robinson & Knee, Limited. Luncheon will be at the Queen's Hotel, Birmingham. The whole of Friday, June 2, will be devoted to a visit to the Thames Foundry and pattern-shop of the Ford Motor Company, Limited, the journey to Dagenham being by boat. The Saturday morning will be free for shopping or sightseeing, and the programme concludes with the annual dinner/dance of the Society in the evening at the Waldorf Hotel, London.

For the ladies a special programme of sightseeing tours has been arranged including Hampton Court, Kew Gardens, Stratford-upon-Avon, as well as tours in Leamington Spa and Birmingham.

Whilst only one works visit, that to the Ford Motor Company, is open to the NSMP membership, to enable members and their ladies to meet the Italian guests, participation in the luncheons is open to them, *i.e.*, at the Continental Restaurant, 203 Uppingham Road, Leicester (12.15 p.m., Tuesday, May 30); at Charing Cross Hotel, London (12.15 p.m., Wednesday, May 31), and the Queen's Hotel, Birmingham (1 p.m., Thursday, June 1).

IBF London Jubilee

In celebration of its Golden Jubilee this year, the London branch of the Institute of British Foundrymen is holding a Jubilee Dinner/Dance at the Hurlingham Club, London, on May 30. Members, guests and their ladies will dine overlooking the delightful lawns and riverside grounds of this gracious house—one of the stately homes of England, floodlit for the occasion—and dancing will take place in the ballroom adjoining. Guests will include Mr. N. C. Macdiarmid, managing director, Stanton Ironworks Company, Limited, and Mr. D. A. Richards, national president, and their ladies. Also invited are the Master and Clerk of the Worshipful Company of Founders, national vice-presidents, and secretary and the treasurer of the IBF, branch presidents and their ladies. Tommy Kinsman and his orchestra will provide the music for the dancing, and several well-known artistes have also been engaged for the evening. The limited accommodation available makes it necessary for applications to attend to be made as early as possible to the branch social secretary, Mr. W. R. Buxton, c/o Eyre Smelting Company, Limited, Tandem Works, Merton Abbey, London, S.W.19.

Review of European Apprentice Competition Requirements*

Summary of Practical and Written Tests set Last Year.

In the April 20 issue of the JOURNAL were given the names of the three apprentices who will be representing the United Kingdom at the fourth European Foundry Apprentice Competition to be held in Munich from May 15 to 19, 1961. At the last meeting of the London branch of the Institute of British Foundrymen public recognition was made of the diligence of the two apprentices—who had been chosen from the area covered by the branch—Mr. E. R. Y. White and Mr. M. Rosendale when Mr. D. A. C. Hutchison, president, made them a presentation of 50 cigarettes each.

In order to assist readers to appreciate the kind of knowledge and skill that will be expected from the entrants, the following brief outline of the salient features of tests set at last year's competition is given, with photographs of aspects of the work.

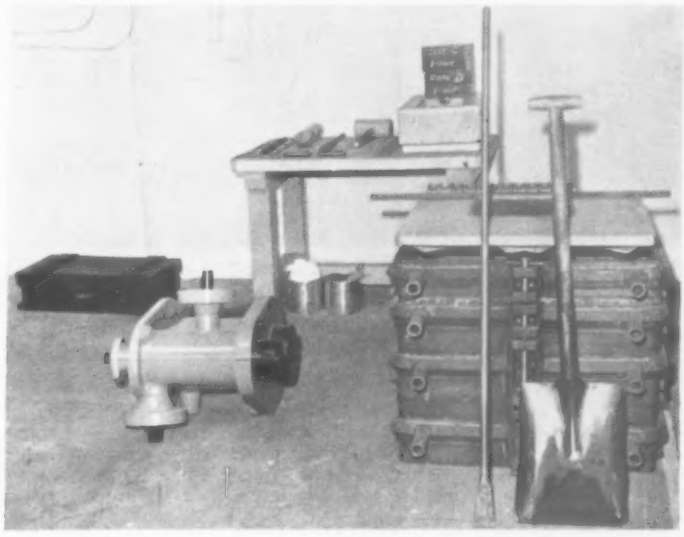


FIG. 1.—*Working site showing the main equipment. The moulding boxes measured* 24 *by* 24 *by* 7*-in. for the cope, and* 24 *by* 24 *by* 3½*-in. for the drag. Each had two equally-spaced bars.*

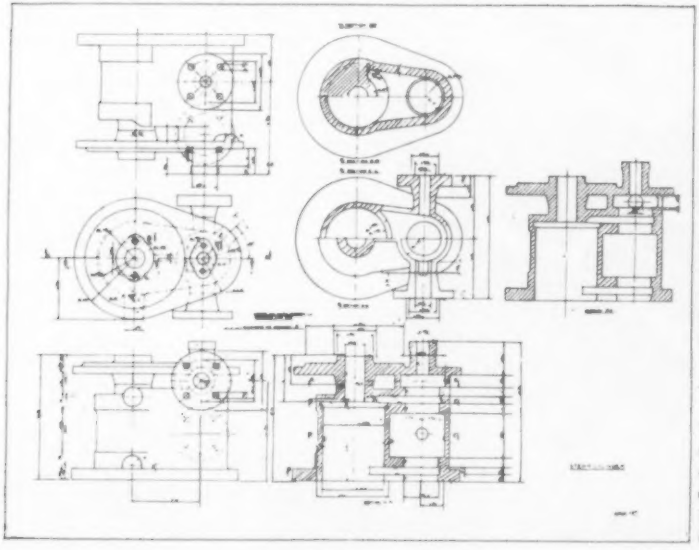


FIG. 2.—*Reproduction of the actual drawing that faced the entrants, presenting elevations and sections typical of those that would confront a foundryman in practice.*

* Abstracted from the "Report of the Third European Foundry Apprentice Competition," distributed in this country by the Council of Ironfoundry Associations.

General Technology

The technology test comprised a two-hour paper of six questions of which the last required a longer essay-type answer giving an opportunity for descriptive treatment. The questions were as follow. (1) Give as many reasons as you can why castings are made by moulding machines instead of by means of loose patterns. (2) List the raw materials and explain the method of preparing a moulding sand for a casting made of any metal of your choice, Indicate

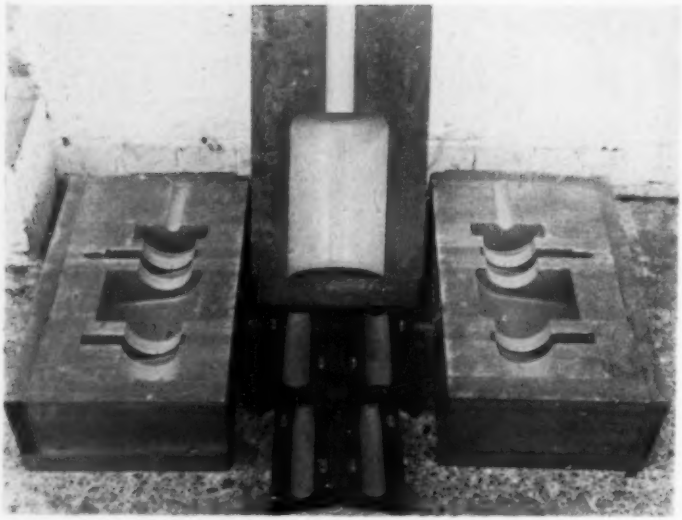


FIG. 3.—*Five coreboxes were provided to make the two body cores in halves, and the two orifice-pieces whole. The large simple body-core required only a half-corebox.*

in your answers (*a*) approximate weight of the finished casting, (*b*) type of metal used. (3) Metal when melted in a furnace is contaminated with slag. Explain how this slag, at various stages, is prevented from entering the mould along with the metal. (4) A casting, in a metal of your choice, has a great variety of wall thicknesses. What points should be watched in this casting during pouring and cooling? What would you do to obtain a sound casting? (5) What are the origins of the gases which are present or are formed during the pouring of a casting and which have to be evacuated? (6) With the aid of sketches describe the application of chills and explain their effects.

Technology

Drawing

In the drawing test competitors were confronted with a drawing showing three fully-dimensioned views of a component from which they were required to project two other aspects and a section. The time allowed for this was two and a half hours.

Calculation

The two-hour paper on calculation was essentially a test of general geometry and physics, applied to practical foundry situations requiring knowledge of how to arrive at a casting weight, the metallostatic pressure on a poured mould, the section thickness of a chain-strap, and the weight of a core.

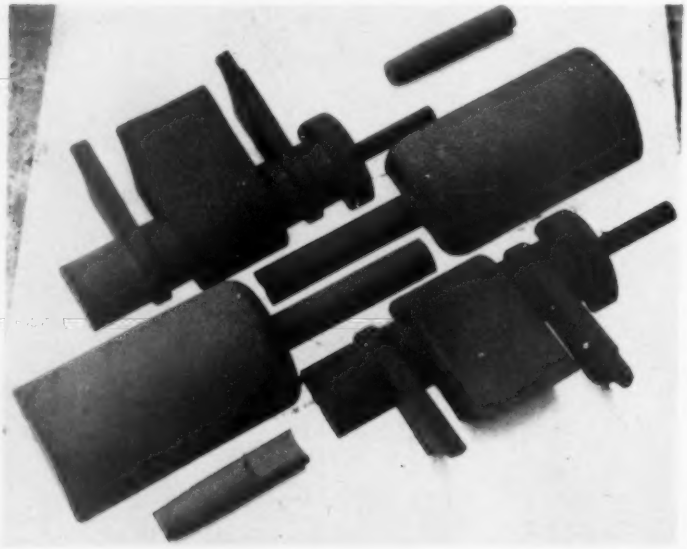


FIG. 4.—*Completed half-cores—made of standard agglomerated sand—laid out for inspection prior to gluing.*

Practical Test

The practical test consisted in making a steam cylinder and involved the competitor in overcoming certain difficulties in respect of the weight of the casting, the positioning of the pattern with regard to the box bars, and the successful management of the loose-pieces and cores. Inspection of Figs. 1 to 6 will give readers an idea of the character of the task and the nature of the problems it presented. Apart from the main equipment that can be seen in Fig. 1, ancillary materials such as core glue, chaplets, and clout nails, etc., were available to each entrant.

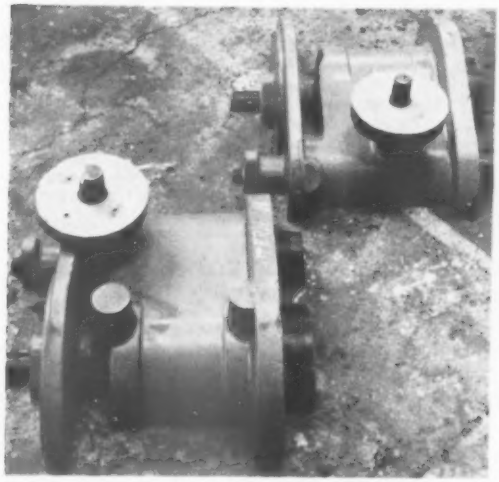
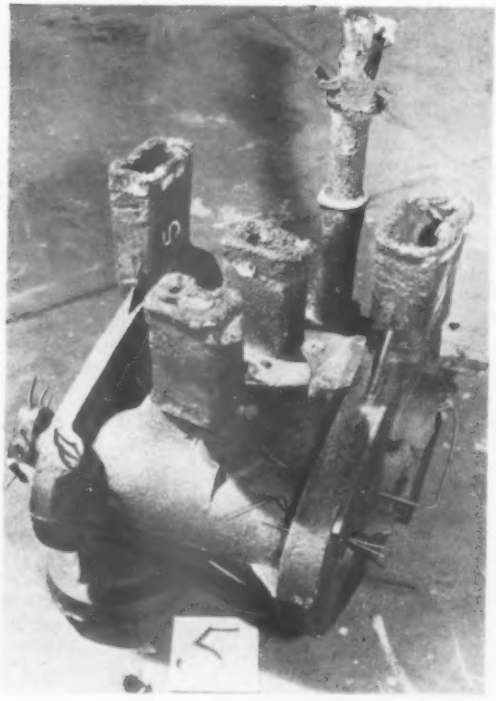


FIG. 5.—*Mould for the cylinder which had to be produced from a split pattern—shown above in halves—carrying three loose pieces.*

FIG. 6.—*As-cast cylinder showing feeding system and the use made of brackets to obviate hot-tearing and nails to chill bosses. The casting was run from the downstick into the two large vertical (as-cast) flanges.*



Company News

STEWARTS AND LLOYDS, LIMITED—Acceptances have been received for over 97 per cent. of the rights issue of 6,000,000 £1 ordinary shares at 44s. per share.

GASKELL & CHAMBERS, LIMITED, engineers, coppersmiths, brassfounders and pewterers, of Birmingham—Final of 27½ per cent. for 1960 raises the dividend to 32½ (25) per cent. In addition, as before, there is a capital distribution of 2½ per cent.

ACROW (ENGINEERS), LIMITED, structural engineers and builders' plant manufacturers, of London, W.2.—The group has made an offer worth 7s. 6d. a share for the 5s. shares of E. H. Bentall & Company, Limited, agricultural engineers, of Maldon (Essex).

AUSTRALIAN ALUMINIUM, LIMITED—The company, which is jointly owned by Aluminium, Limited, and British Aluminium, Limited, earned a consolidated profit of £A470,370 for 1960, but is omitting a dividend in order to conserve cash resources for financing plant extensions.

NEW BROKEN HILL CONSOLIDATED, LIMITED, base metal producers, of NSW, Australia—With a final of 40 per cent. tax free, total dividend for 1960 is being raised to 60 (45) per cent. tax free. Net profit went up to £1,137,385 (£796,238), after tax of £669,087 (£394,609).

WORTHINGTON-SIMPSON, LIMITED, manufacturers of pumps, compressors, and heat exchange equipment, of Newark (Notts)—Profits for 1960 increased from £886,051 to £1,003,023, and after tax of £484,000 (£410,000), the net balance is up from £476,051 to £519,023. The dividend is raised by 5 per cent. to 25 per cent. with a 15 per cent. final.

DELTA METAL COMPANY, LIMITED—Mr. W. E. Ogden, chairman, reported to the annual meeting on Thursday of last week that results for the first quarter of the current year, before taking into account profits of the two new acquisitions, were better than the corresponding quarter of the previous year, which was a record. The resolution to create 16,000,000 5s. ordinary shares was passed.

BRUCE PEEBLES & COMPANY, LIMITED, electrical engineers, etc., of Edinburgh—It has been decided to proceed with the merger with the Belmos Company, Limited. Mr. Thomas Coughtrie, the new chairman, says that results for the first quarter of the current year are reassuring, following the 1960 trading loss of £152,636 (£52,276 profit). He hopes that the company will soon reap the benefit of the massive investment of recent years.

BRITISH INSULATED CALLENDER'S CABLES, LIMITED—The company, which already owns £301,391 of the £500,000 ordinary capital of Thomas Bolton & Sons, Limited, is offering to acquire the balance of the £1,400,000 capital. Terms are one BICC £1 ordinary share for every Bolton £1 ordinary share, 18s. 6d. cash for each of the 300,000 5 per cent. first cumulative preference and 18s. cash for each of the 600,000 4½ per cent. second cumulative redeemable preference.

HOPKINSONS, LIMITED, makers of valves and boiler mountings, of Huddersfield—Sales to January 31, 1961, were similar to those of the previous year. The directors hope to achieve some degree of expansion during the current year to meet the improvement in the volume of orders received during the last six months of 1960-61. The volume of orders increased by 10 per cent. over the previous year, while export sales advanced by 14 per cent. Negotiations are in hand for further contracts for products for proposed new nuclear power plants.

Dinners

IRON & STEEL INSTITUTE

The annual dinner of the Iron & Steel Institute was held on Wednesday, May 3, at Grosvenor House, Park Lane, London. Some 1,500 members and guests were present. After the Loyal Toast, the toast of the "Iron and Steel Institute and Industry" was proposed by Sir Howard Florey (president, The Royal Society), and Sir Charles Goodeve, O.B.E., F.R.S. (president of the Institute and director, British Iron & Steel Research Association), replied. Sir Charles also proposed the toast of "The Guests," Sir Roger Makins, G.C.B., G.C.M.G. (chairman, United Kingdom Atomic Energy Authority), responding.

Accompanying Sir Charles at the top table were Sir Howard Florey, Sir Roger Makins, Viscount Ridley, C.B.E. (chairman, Consett Iron Company, Limited), Mr. C. R. Wheeler, C.B.E. (past-president), H.E. Herr Hans von Herwarth (German Ambassador), H.E. Dr. E. N. van Kleffens (Ambassador of European Coal and Steel Community), Mr. W. F. Cartwright, Sir Julian Pode (hon. treasurer), H.E. Lt.-Gen. M. Yousuf (High Commissioner for Pakistan), H.E. the Rt. Hon. Sir E. Harrison, K.C.V.O. (High Commissioner for Australia), Sir R. Morison, Q.C. (independent chairman, British Iron and Steel Federation), Sir Andrew McCance, F.R.S. (chairman, Colvilles, Limited), Mr. A. H. Ingen-Housz (past-president), Mr. P. van Delden (managing director, Royal Netherlands Blast Furnaces and Steelworks, Limited), Hon. R. G. Lyttelton (past-president), Lt.-Col. Lord Dudley Gordon, D.S.O. (chairman, Hadfields, Limited), Air Marshal Sir Walter Merton, K.C.B., O.B.E. (Air Member for Supply and Organization, Air Council), Mr. E. Wijkander (hon. vice-president), Mr. G. Schjelderup (hon. vice-president), Mr. H. Peake (chairman, Steel Company of Wales, Limited), Dr. C. Sykes, C.B.E., F.R.S. (vice-president), Mr. D. Freeth, M.P. (private secretary, H.M. Minister of Science), Professor Dr. H. Schenck (president, *Verein Deutscher Eisenhüttenleute*), Mr. J. H. B. Chapman, director of naval construction, Admiralty), Dr. M. Tigerschiöld (Bessemer Medallist), Mr. H. S. Wingate (president, International Nickel Company of Canada, Limited), Dr. H. Biers (hon. vice-president), Sir J. Green (chairman, Thos. Firth & John Brown, Limited), Mr. J. Wurth (managing director, S.A. Cockerill-Ougrée, Belgium), Dr. B. G. Grönblom (hon. vice-president), Mr. C. H. T. Williams (Master Cutler), Dr. J. Oberegger (hon. vice-president), Dr. H. P. Weitzer (Austria), Mr. W. Poensgen (director, Christiania Spigerverk A/S, Norway), Dr. R. F. B. Bennett, M.P. (chairman, Parliamentary and Scientific Committee), Mr. W. Barr, O.B.E. (past-president, and Bessemer Medallist, 1961), Sir R. Shone, C.B.E. (Iron and Steel Board), Sir K. Hague (president, Institution of Mechanical Engineers), Dr. M. Marchesi (managing director, FINSIDER, Italy), Mr. A. Vivaldi (director, ILVA S.p.A., Italy), Mr. W. A. Horrocks (senior trade commissioner, Union of S. Africa), Mr. R. Mather (past-president), Dr. L. B. Pfeil, O.B.E., F.R.S. (member of Council), Sir H. D. MacLaren, K.B.E., C.B., D.F.C. (president, Institution of Electrical Engineers), Mr. G. C. R. Eley, C.B.E. (chairman, Richard Thomas & Baldwins, Limited), Mr. D. F. Campbell (hon. vice-president), Mr. I. F. L. Elliot (hon. vice-president), Professor H. O'Neill (president, Institute of Metals), Mr. G. Watillon (*Groupement des Hauts-Fourneaux et Acieries Belges*), Mr. J. Mitchell, C.B.E. (past-president), Mr. H. W. A. Waring, C.M.G. (member of Council), Mr. T. F. W. Jackson (chairman and managing director, Union Carbide, Limited), Mr. A. Myrtsymov (E.C.E. Steel Commission, Geneva), Mr. E. W. Senior, C.M.G. (British Iron and Steel Federation), Professor A. G. Lefebvre (*Soc. Roy. Belge des Ingenieurs et des Industriels*), Sir G. Sutherland, F.R.S. (director, National Physical Laboratory), Mr. W. E. Bardgett (president, Institution of Metallurgists), Professor B. M. S. Kalling (Bessemer Medallist), Mr. C. C. Inglis (British Transport Commission), Mr. G. L. Bailey, C.B.E. (director, British Non-Ferrous Metals Research Association), Professor D. Williams (president, Institute of Mining and Metallurgy), Dr. W. A. Macfarlane, C.B.E. (president, Institute of Fuel), and Mr. R. Miles (president, British Cast Iron Research Association).

Luncheon

BRITISH S.-G. IRON PRODUCERS

Following the annual general meeting of the British S.-G. Iron Producers' Association, a luncheon of member-firm representatives and a small number of guests was held at the Connaught Rooms, London, on May 4. Mr. H. J. V. Williams, from the chair, welcomed the guests, stating that the Association now numbered 42 member-firms of whom 35 were active producers of spheroidal-graphite castings. Dr. L. B. Pfeil, O.B.E. (Inco (Mond), Limited) responded on behalf of the guests and gave a brief résumé of the present state of the production of s.-g. iron castings. Last year, he had given the output of s.-g. iron castings by Inco and Mond licensees in 1959 at 315,000 tons, bringing the aggregate to a total exceeding 1½ million tons. The 1960 output had been 380,000 tons, so that it was now almost certain that to date almost 2 million tons of the material had been cast.

Dr. Pfeil went on briefly to mention the successful conference of licensees at Innsbruck in Austria last September and to his forecast that research would enable magnesium-containing iron to be held for long periods at constant or increasing temperature. This technique, he said, had since been demonstrated enabling "clean" metal to be produced which yielded s.-g. iron castings without further magnesium addition; he was confident it would come into routine use, especially in mechanized foundries. Further research in the UK and America had developed two new types of nickel-containing s.-g. iron with outstanding properties. The first gave a tensile of 50 to 55 tons per sq. in., associated with elongation of 15 per cent., both in the annealed condition; the second material was an austenitic iron of special composition which when appropriately heat-treated gave Charpy Vee-notch impact values in excess of 20 ft.-lb. at a temperature of −196 deg. C. On the production side, there were developments of nickel-containing magnesium alloys specially designed for addition by plunging which he claimed to be both more efficient and more economical than those hitherto available. At the conclusion of the proceedings, Mr. M. J. Glenny, chairman of the Council of Ironfoundry Associations, proposed a vote of thanks to the chair.

At the annual meeting held earlier, Mr. P. B. Lake of Lake & Elliot, Limited, Braintree, was elected chairman of the Association, the new incoming vice-chairman being Mr. W. H. Harper (of John Harper & Company, Limited). Mr. P. A. Russell (S. Russell & Sons, Limited) continues as honorary treasurer and Peat, Marwick, Mitchell (94/98, Petty France, London, S.W.1) as secretaries. The meeting discussed trends in the development of the material and the continuing need to educate possible users in its value, although this latter propaganda was said to be starting to gain impetus. It was reported that five new licensees had joined the Association during the year—the seventh since it was formed.

West of England Works Visits

Details of Further Plants and Processes to be inspected by IBF Parties during the Cheltenham Conference.

In last week's issue of the JOURNAL were published accounts of the background and main features of four of the works in the West of England which will be visited by parties on the occasion of the annual IBF Conference. Continuing this preview the accounts are now completed with descriptions of the seven following establishments: Gloucester Foundry, Limited; Newman Industries, Limited; Douglas (Kingswood), Limited; Newman Hender & Company, Limited; Imperial Smelting Corporation, Limited; Stothert & Pitt, Limited; a few details only are given in the case of Westinghouse Brake & Signal Company, Limited, as it is hoped to publish a lengthier account of this works in a forthcoming issue of the JOURNAL.

(Continued from page 562)

Gloucester Foundry Limited

Gloucester Foundry, Limited, was formed in 1930 and is a wholly-owned subsidiary of Gloucester Railway Carriage & Wagon Company, Limited. Production of the company consists entirely of blackheart and pearlitic malleable iron castings which vary in weight from 2 to 100 lb., for agricultural, automobile, railway and general-engineering industries. The works extend over an area of approximately 4½ acres and are adjacent to the main London railway line. The company has its own rail siding which feeds into a central raw-material stockyard, serviced also by an overhead gantry crane, this unit is also capable of dealing with materials delivered to the works by road.

Layout of the Works

Pattern equipment (either wood, conventional metal patterns or pressure-cast metal patternplates) are produced in the company's patternshop which forms part of the works. Metal for casting production is produced by the cupola/arc-furnace duplexing process (Fig. 1) which is under strict laboratory supervision. Moulds are produced in the main shop and are fed to a pallet conveyor for continuous pouring, the poured moulds being removed mechanically from this conveyor to shake-out machines. Following this operation, castings are fed to an overhead cooling conveyor along which they are transported to the fettling and inspection station. From thence, castings are next moved to the heat-treatment section, the latter employs a two-stage batch-type electric annealing furnace and an electric tunnel-type furnace; a number of oil-fired batch-type annealing furnaces are also in use. After heat-treatment, castings are moved to the fettling and finishing section by means of containers and fork-lift trucks; these sections are provided with the usual duplex grinders, hydraulic presses and airless shotblast units. Cores are produced in a shop adjacent to the moulding line, core-handling being facilitated by a monorail conveyor and a steel-belt conveyor. Core-drying is effected in a pair of vertical core ovens. A considerable number of shell cores are used and these are produced on fully-automatic shell coremaking machines.

Newman Industries, Limited

Newman Industries, Limited, Yate, Bristol, who celebrate the silver jubilee of their incorporation this year, are one of Britain's leading manufacturers

FIG. 1.—*Collecting metal at the electric-arc duplexing/holding furnace at Gloucester Foundry, Limited, producers of malleable-iron castings.*

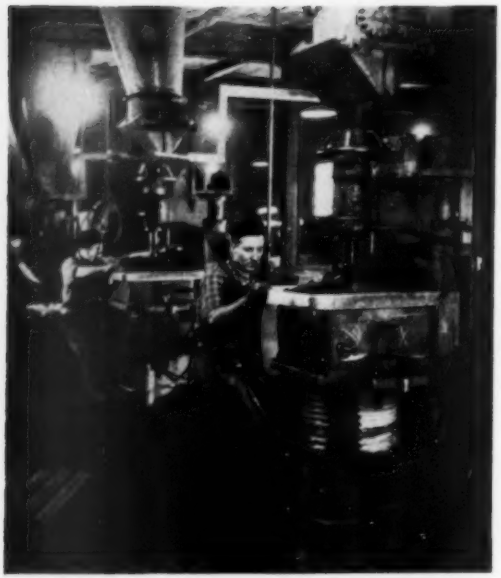


FIG. 2.—*Part of a moulding-machine battery in Newman Industries' iron foundry at Yate. There is the usual overhead sand supply from lever/gate discharge hoppers and short roller conveyors nearby are used for mould assembly.*

of electric motors. Since the end of the war, the company has greatly expanded its output and is to-day established as one of the largest British exporters in this field. In fact, more than 60 per cent. of the motors produced at Yate are sold overseas to more than 62 different countries, the majority going to the US where the company has an extensive selling organization. Newman's motors are made for many different applications, ranging in size from $\frac{1}{16}$ h.p. to 600 h.p.

Another important aspect of the company's activities is to be found in its machine-tool rebuilding shops, which handle machines up to 200 tons. In this division, modern methods are used to strip down and rebuild machinery to original makers' limits of accuracy. Two years ago, the company also formed an electronics division to develop process-control equipment, and this is also expanding rapidly at the present time.

Foundries

Newman's rely entirely on their own foundries for the production of castings for the manufacture of their electric motors, the modern ferrous foundry producing some 100 tons of castings per week (see Fig. 2). For casting aluminium and aluminium-alloy components, the company uses seven pressure-die-casting machines which utilize about eight tons of aluminium and alloy ingots per week. The foundry at Yate was originally established early in the last war when the entire production of the factory was harnessed to the production of 500-lb. bombs. The steel casings for these were poured from an electric-arc furnace of 5 tons capacity.

At the end of the war, the foundry was converted to produce iron castings to match the firm's electric-motor production programmes and at that time it had a maximum output of about 9 tons per week, this output however has increased steadily since that time.

Extensions in Progress

At the present time, the foundry is being extended and re-equipped and by the end of the summer when these alterations are complete, it will have a weekly capacity of 150 tons. The first two stages of this modernization plan have already been carried out, with the installation of a new sand-preparation plant and new twin cupolas. The next stage will be the installation of a fast-moving pallette plate system, the adoption of standardized moulding boxes, and automatic Stone-Wallwork moulding machines, with continuous casting, the moulds passing to Hewitt Robins' automatic shakeouts. Provision has also been made for the installation of a third cupola at a later date when needed.

The cupolas (Fig. 3) are loaded by a weigh-skip system, together with skip-hoist loading, and are run alternately each day from 7.30 a.m. until 5 p.m. The sand plant has a reserve sand-holding capacity of 85 tons and is coupled with a rotary-screen equipped with wet-type dust-arresters. Sand is milled and fed to the moulding machines by two 30 tons per hr. continuous mills, installed by Foundry Mechanisations (Baillot), Limited. After casting, used sand is fed back by vibratory knock-outs to underground conveyor belts which return it through screens and past an electro-magnetic separator to holding hoppers above the mills.

Both oil-sand and CO_2 Process coremaking are carried out by Newman's, as well as some shell blowing. The foundry is served by three core-blowers, taking various sizes of boxes, and cores are then fed by continuous belt to a Bradshaw continuous coredrying stove.

In another section, an automatic shell-moulding machine produces 30 complete shells per hr., up to a maximum size of 29 by 19 in., a hand machine also producing small shells. A Polygram Simplex shell-maker is to be installed shortly for the production of shells up to 16 by 16 in. The resin/sand mix for these machines is produced by the dry-sand method.

The company's foundry is supported by its own laboratory which carries out control analyses of iron, aluminium and aluminium-bronze castings. Regular sand tests and tensile and gamma-ray tests are also conducted by the laboratory staff of metallurgists.

Non-ferrous Section

In the non-ferrous foundry of the company, pressure-die-casting is carried out only for internal

requirements. Six horizontal machines—four Triulzi and two Leicester-Phoenix models—produce the smaller castings, ranging in size from a few ounces up to 14 lb., each machine being fed from its own 300-lb. bale-out furnace. In the same department, a 250-ton Daniel vertical die-casting press produces castings for large rotors, and a small E.M.B. zinc-alloy casting unit produces switches and terminal-box covers for fractional-horsepower motors.

Recently, two members of the foundry staff visited Milan to study factories using the Tagliaferri electric furnace, and Newman's are at present considering the possibility of installing one of these furnaces for producing shell-moulded sections. Patterns for the foundry are all turned out in the company's own modern patternshop, which produces them in metal, wood and resin.

Douglas (Kingswood), Limited

In the year 1882, William Douglas and his brother Edwin commenced business as engineers and iron-founders at Kingswood, Bristol, under the name of Douglas Brothers, and for several years they made cast-iron lamp-posts, manhole covers and lasts for shoes. At the turn of the century, motor-bicycles were beginning to be made and the Douglas brothers thought they too would enter this field. Thus, in 1907, when they were employing about 60 people, they started manufacturing Douglas motor-cycles. They specialized in the horizontally-opposed twin-cylinder engine and in a very short time acquired a worldwide reputation. This was not so surprising as in 1912 they won the TT and later the Grand Prix of France and obtained many other world records. During the first world war the works were taken over by the Government and for four years motor cycles were produced at the rate of 300 per week for the army—in addition to a large number of spare parts.

After the 1914-18 war, the firm changed its name to Douglas Motors and on March 15, 1920, had the honour to be appointed motor-cycle makers to HM King George V. (At that time, two of the company's machines were in constant use by HRH the Duke of York and HRH the Duke of Gloucester.) From 1920 to 1935, the manufacture of motor-cycles continued and Douglas became famous yet again on all the race-tracks of the world. During this period, the company designed a motor-car, but for some reason, only six were made. In June, 1935, the company was taken over by Aero Engines, Limited, and in the year following, the manufacture of motor-cycles was abruptly terminated. Instead, the firm turned to the making of Sprite Mark II and 1½-litre O.H.B. aero-engines, in addition to a variety of industrial trucks.

FIG. 3.—*View of the existing cupola plant at Newman Industries' iron foundry. On the left a member of the firm's metallurgical staff is engaged on quality checking of the metal and on the right is the ladle-preparation section and a shell-mould pouring station. Note the use of run-out bogies to carry ladles for handling by the main shop crane as required.*

FIG. 4.—*Heavy moulding section at Douglas (Kingswood), Limited, where iron castings up to 8 tons weight are produced by highly-skilled moulders.*

Post-1940 Developments

During the second world war, some 2,500 people were employed by the company in producing parts for the Spitfire, Defiant and Firefly aeroplanes, and portable generating sets were also made, using a suitably-adapted version of the company's 350-cc. flat-twin motor-cycle engine. In February, 1946, the name of the firm was again changed, this time to Douglas (Kingswood), Limited, the well-known motor cycle was reintroduced and in addition electric vans and industrial engines were manufactured. By this time, the conventional motor-cycle had a serious competitor—the motor scooter—and, imported from Italy, Vespas were a familiar sight on every road. In 1951, the Bristol company produced their first Vespa under license from the Italian company and at the present time, these machines are produced at Kingswood at the rate of 500 per week. However, the aircraft side was not neglected and, since the end of the second world war, the aircraft section of the company was for a long time fully engaged on the manufacture of flaps, ailerons, pressure structures, windscreen and hooding sections for the famous Bristol " Britannia " aircraft. This work has now ceased.

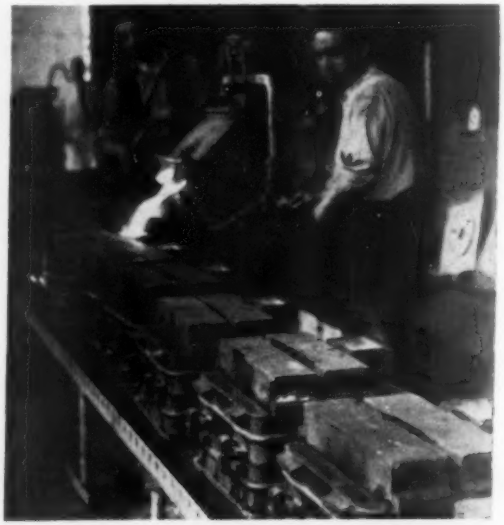
In 1955, the firm became a subsidiary of the Westinghouse Brake & Signal Company, Limited, with the result that in addition to its other lines, Douglas now produces the Westinghouse air brake for road vehicles as well as pneumatic and fluid control systems, rail brakes, brake-cylinder and slack-adjuster units.

Foundry Set-up

The present foundry at Kingswood (Figs. 4 and 5) now houses an iron foundry, a non-ferrous foundry, shell-moulding plant and gravity-die-casting shop, with the usual ancillary sections for fettling, heat-treatment, etc. In the jobbing bay of the iron foundry, castings are produced up to eight tons in weight and the bay also has its own coremaking section. There is also a machine-moulding bay, which is used for the CO_2 Process only, and produces moulds both from machines and from floor moulders. A gravity roller-conveyor and overhead monorail is used for castings in this section. In the coreshop, small-batch and one-off types of orders are executed by hand at the bench, but quantity production is obtained with a Hansberg coreshooter and coupled gassing machine, again using the CO_2 Process. The majority of cores for cylinder and crankcase castings are in fact produced on the Hansberg machine.

A new shell-moulding section of the firm is completely self-contained and includes an automatic shell producer, a shell coreblower and closing machines. This department has direct access into the fettling shop and an overhead monorail from the cupola is used to carry metal for the casting of moulds. This metal is furnished from two cupolas situated in the centre of the foundry on the main gangway, and having direct access to all sections. B.S. grade-14 iron is used for general purposes, but a special iron is produced for air-cooled cylinders and crankcases; alloy irons, also, are often required to suit customer's specifications.

FIG. 5.—*Section of the casting conveyor in the mechanized section of the Douglas foundry. Here monorail-carried ladles are used mainly to pour machine-made moulds.*



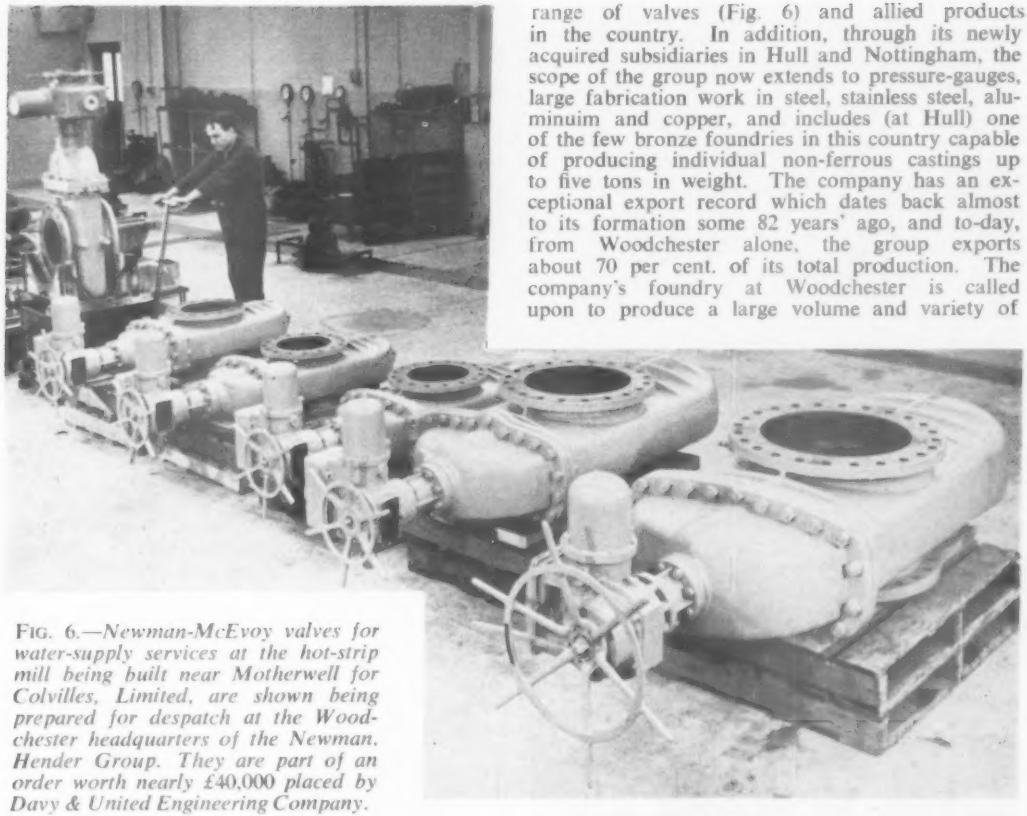


FIG. 6.—*Newman-McEvoy valves for water-supply services at the hot-strip mill being built near Motherwell for Colvilles, Limited, are shown being prepared for despatch at the Woodchester headquarters of the Newman, Hender Group. They are part of an order worth nearly £40,000 placed by Davy & United Engineering Company.*

In the non-ferrous foundry of the company, copper-base castings are produced up to 10 cwt. in weight, together with light-alloy castings. Both machine and floor moulding is carried out here, many of the castings being produced in this section are subject to pressure testing. Gravity-die-castings are also made in aluminium alloys up to 11-lb. in weight, the two main alloys used being LM 6 and LM 16. A die-shop adjoins the non-ferrous fettling section and the heat-treatment plant.

The company produces all the castings required by their engineering sections and, in addition, produce also for the commercial market, the works being well equipped to handle a wide range of castings in various iron, non-ferrous and light alloys.

Newman, Hender & Company, Limited*

The Newman, Hender group of companies, Woodchester, Gloucestershire, comprises 10 active companies in this country as well as subsidiaries in Canada, France and South Africa. Between them, they produce and sell one of the widest range of valves (Fig. 6) and allied products in the country. In addition, through its newly acquired subsidiaries in Hull and Nottingham, the scope of the group now extends to pressure-gauges, large fabrication work in steel, stainless steel, aluminuim and copper, and includes (at Hull) one of the few bronze foundries in this country capable of producing individual non-ferrous castings up to five tons in weight. The company has an exceptional export record which dates back almost to its formation some 82 years' ago, and to-day, from Woodchester alone, the group exports about 70 per cent. of its total production. The company's foundry at Woodchester is called upon to produce a large volume and variety of ferrous and non-ferrous valve-bodies ranging in size from ½- to 30-in. full bore and up to 1 ton in weight, with associated components, and occupies a floor area of about 45,000 sq. ft. Every opportunity has been taken to adopt new techniques and processes with a view to "streamlining" foundry production and improving casting quality. For example, nine years' ago, Newman, Hender were one of the pioneers in Great Britain of the practical application of shell moulding and are now among the leading exponents of the process. Much experience has been gained in this field and the company is already producing nearly 50 per cent. of its non-ferrous output from shells and is still building up this section. At present, shell moulding is almost entirely confined to the production of bronze valve bodies, up to 2-in. bore.

Plant and Equipment

One of the most interesting machines to be seen in the shell-moulding section is a fully-automatic, electrically-heated "biscuit" making machine (Fig. 7), believed to be one of only two such units so far installed in this country. Two other semi-automatic gas-heated shell machines are also in use.

* In last week's issue of the JOURNAL (p. 555) appeared an aerial view showing the rural setting of this works.

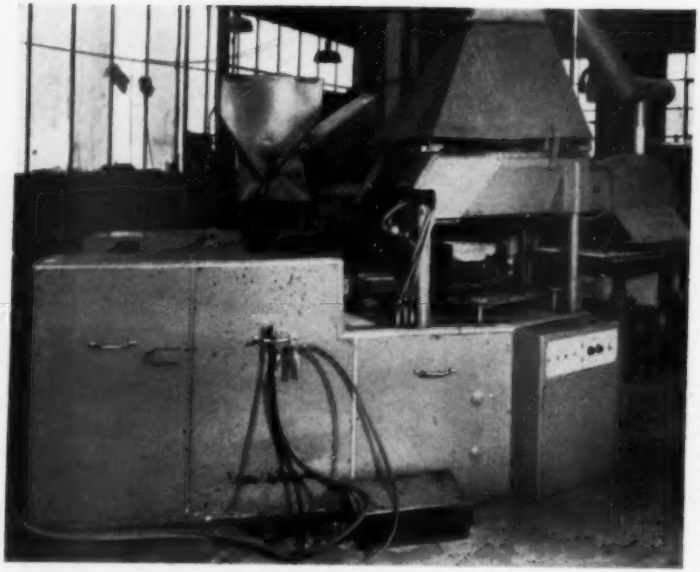


FIG. 7.—*Fully-automatic, electrically-heated "biscuit" making machine—part of the Newman, Hender shell-moulding plant and believed to be one of only two such machines so far installed in this country.*

All are multi-station types and give a combined output of 140 moulds per hr. The process has now been extended to core-making and the company has a battery of six shell-coreblowing machines, four of which were designed and built domestically. Another recent development in this field has been the installation of a sand pre-coating plant (Fig. 8), which ensures a more-even coating of the sand grains with resin and in turn gives a better bond and a shell of improved mechanical strength compared with dry mixing.

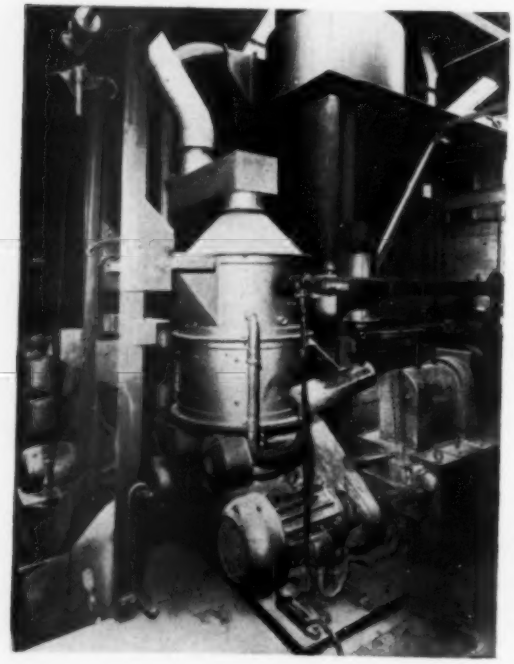


FIG. 8.—*Fordath pre-coating unit for resin/sand installed at the Woodchester Foundry. It is reported that liquid resin incorporated in this way gives better results than dry-mix material and economies are also expected in the amount of resin required.*

The conventional sand moulding and casting section of the foundry is divided into two main parts, ferrous and non-ferrous. Over 7,000 patterns are held in store for castings varying in weight from 1 oz. up to 5½ cwt. The majority are 2 cwt. or below and are machine moulded, the balance being handled by a small floor-moulding section. Some sizeable grey-iron and steel castings are produced and the CO_2 mould- and core-hardening process is used extensively throughout.

Iron Foundry

The company's iron foundry produces 45 to 50 tons of finished castings per week, including 7 to 12 tons of castings extra to the company's own requirements. Metal is melted in two mechanically-charged, cold-blast cupolas operating on alternate days and each with a capacity of 2 tons per hr. The bulk of the castings are produced to BS grades 12 and 14, although occasionally grades up to 17 are called for. Eleven moulding machines are in use—eight are of the jolt/squeeze type (using boxes 14 by 16 in.), two are jolt/squeeze/rollovers (with boxes 20 by 20 in. and 20 by 24 in.), and one is hand operated, taking boxes 10 by 10 in. The machines feed the moulds on to a conventional conveyor track, where pouring is carried out from two 5-cwt. capacity ladles carried from a monorail. There is also a fully-mechanized knockout and sand-conditioning plant, the reconditioned sand being automatically conveyed back to the machine hoppers. Other equipment includes three shotblast units (one drum-type and two cabinet). The fettling shop is equipped with a swing-frame grinder for the larger work and seven double-ended pedestal grinders.

FIG. 9.—*Casting of metal—but with a difference. In this shop, the visiting IBF members will see the pouring of crude zinc tapped from vertical-retort furnaces. (Imperial Smelting Corporation, Limited).*

Non-ferrous Foundry

Newman, Hender's non-ferrous foundry is equipped with six 600-lb. tilting furnaces and three 170-lb. lift-out oil-fired furnaces for metal melting. The larger furnaces are used exclusively for bronze melts, whilst the smaller ones handle special melts such as cupro-nickel as well as some aluminium alloys used by the company in the production of their own patterns and coreboxes. Moulding in this foundry is entirely by machine and there are a further 11 machines in this section entirely devoted to non-ferrous work. The remainder of the equipment and methods follow the pattern of the ferrous side.

Other Sections

In the company's coreshop, a large variety of intricate cores are in continuous production by the oil-sand, CO_2 and shell processes and coreblowers and coreshooters are used as well as hand production. Oil-sand cores are baked in a continuous oven and other equipment includes two coresand mixers. In a new workshop, Newman, Hender have adopted epoxy-resin patternmaking, and already this shop is producing a substantial quantity and variety of plastic patterns.

There is strict metallurgical control on both floors of the foundry and, in a well-equipped laboratory, routine analyses and mechanical testing of all incoming raw materials and of foundry output are carried out. Melt samples are taken at regular intervals for cast iron and standard bronze alloys and from all the special-alloy melts. A separate section of the laboratory is concerned with the routine checking of all types of sand used, with special emphasis on the clay and resin content of shell-moulding sand. There is also a gamma-ray department which is used for checking castings for soundness, particularly where major pattern changes or new patterns are involved.

Imperial Smelting Corporation, Limited

Prior to the first world war, the United Kingdom was almost entirely dependent on Continental smelters for its zinc requirements and this led to a supply crisis in wartime and the strategic necessity for the establishment of zinc smelters in this country was evident. In 1924, the Avonmouth Works (which had been set up by the British Government as a sulphuric-acid works) and an existing zinc smelter at Swansea, were taken over by the National Smelting Company, Limited, with the objective of building up an industry to supply the country's essential zinc requirements. In 1929, Imperial Smelting Corporation, Limited, was formed, absorbing the National Smelting Company, Limited, and, subsequently, zinc works at Seaton Carew, and Bloxwich, and pigment and sulphuric-acid works elsewhere in the UK. In 1949, the Consolidated Zinc Corporation, Limited, was formed by a merger of the Imperial Smelting Corporation, Limited, with Zinc Corporation, Limited, the Australian mining company with which it had been most closely associated.

Processes at Avonmouth

The operations at Avonmouth during the 36 years of its existence have developed around the extraction of zinc, and manufacture of sulphuric acid from zinc-sulphide concentrates mined in Australia. Its products also include cadmium, ammonium sulphate, aluminium sulphate, hydrofluoric acid and various fluorides and sulphuric-acid catalyst. Initially, zinc extraction was carried out by the horizontal-retort process, but was augmented by the more modern vertical-retort process (Fig. 9) in 1934. The horizontal-retort process was eventually replaced by the Imperial Smelting Process in 1958. This latter process was initiated and developed at Avonmouth and enables the concurrent production of zinc and lead in a blast-furnace and has been adopted by a number of overseas smelting companies.

Both the vertical-retort and the company's own process involve sintering of the raw sulphide concentrate, during which it is converted to oxides of zinc and lead, in a physical form suitable for reduction to metals in one or other of the two processes. Sulphur dioxide is evolved during sintering and this is converted to sulphuric acid.

FIG. 10.—*Pouring of refined zinc metal into plate moulds at the Avonmouth works of Imperial Smelting Corporation.*

Cadmium is also eliminated at this stage, later to be collected and worked up for the production of metallic cadmium. The vertical-retort process involves heating a briquetted mixture of zinc oxide (sinter) and carbon in a large vertical column, condensing the zinc vapor evolved and casting the condensed liquid into 56-lb. moulds. In the Imperial Smelting process, charges of coke and lump sinter, containing both zinc and lead oxides, are introduced into the top of a blast-furnace. The coke provides both the heat requirements and also the carbon for reduction of the oxides to zinc and lead. Zinc vapour leaves at the top of the shaft to be condensed in a shower of molten-lead droplets; lead and slag are tapped from the bottom of the furnace.

Research and Development

More recent developments in the metallurgical field at Avonmouth are the production of beryllium and beryllium/copper alloys. Extension in the chemical field has been based largely on sulphuric acid. Anhydrous hydrofluoric acid has been made since 1946 and this has led to the production of various fluorine compounds, notably to the range of chlorofluorocarbons for refrigerants and aerosols, which go under the trade name of Isceons. Research and development for the various processes carried out in the UK is centred at Avonmouth and involves not only the solution of production problems and investigation of new opportunities, but also a service to the customer in the uses to which they put the company's products.

Members of the Institute of British Foundrymen who will be visiting the firm will see the production of zinc from the handling of incoming concentrates, through the sintering process, to the final extraction by the two current methods, *i.e.*, the vertical-retort and the Imperial Smelting processes (Figs. 10 and 11).

Stothert & Pitt, Limited

Stothert & Pitt, Limited, Bath, was founded in 1820 and consisted originally of a foundry situated in Newark Street, Bath. About 1875, the Newark Works were moved to the site in Lower Bristol Road, although the premises at that time were considerably smaller than those existing to-day. At a later date, a boiler shop was built about half a mile along the road on part of the site of the company's present Victoria Works.

The company's production in the early days was varied and included steam engines, cranes, bread-making and soda-water machinery and piston pumps. Amongst the present-day products are cranes for cargo and grabbing duties, transporters, bridge cranes, overhead-travelling cranes, ship-building and dry-dock cranes and many types of ships' deck machinery. A large variety of plant used in the construction of roads and other contractors' work is also produced, including concrete mixers, truck mixers, batching plants, tarmacadam and asphalt plants, vibratory finishers and vibratory rollers. Amongst other special equipment designed and made by the company are multi-bucket excavators for the extraction of clay, gravel and sand, for the brick and other similar trades, travelling

FIG. 11.—*Part of the control room at Imperial Smelting Company's works.*

FIG. 12.—*General view of the jobbing floor of Stothert & Pitt's iron foundry. The spaciousness of the shop, good natural lighting, and concreted floor all contribute to orderly production.*

scrapers for handling chemicals inside storage silos, and three types of positive-displacement pumps.

Foundries

The number of employees at Stothert & Pitt, Limited, fluctuates, but at present the total is approximately 2,000. The foundry side of the organization comprises a patternshop, stores, jobbing and semi-mechanized foundries, and a small non-ferrous foundry. The number employed in all sections is approximately 150 and the annual output of the iron foundries is in the region of 3,000 tons of castings, varying in weight from a few lb. to six tons.

Jobbing

In the company's jobbing iron foundry (Fig. 12), items of special interest include a sand-preparation plant, incorporating an August Simpson mill, which supplies sand to floor moulders, three jolt/rollover machines and one Sandslinger unit. Melting is carried out in two 36-in. dia. cupolas, which are mechanically charged. Dry-sand moulding is employed for the majority of the work, but CO_2 and greensand are also used. Gas has many uses in this foundry, but principally in the two mould-drying stoves. These are designed on the recirculation principle, taking the hot products below the floor to a return position above the combustion chamber, and each has internal dimensions of 20 in. by 3-ft. 6-in. by 10-ft. 3-in. high.

Semi-mechanized Section

The semi-mechanized foundry, too, has its own sand plant, which feeds four jolt/squeeze/rollover machines and two pin-lift moulding machines. Most of the work produced in this foundry is low-alloyed and high-duty irons. Two cupolas of 24-in. dia. are used for melting and these are mechanically charged. The finished moulds are accumulated on roller conveyors (Fig. 13) to enable casting to be carried out over a relatively-short period of the day at one casting station.

Non-ferrous Department

In the company's non-ferrous foundry, castings are produced from a few oz. to 9 cwt. in weight in a variety of copper-base alloys. CO_2 moulding and coremaking is now superseding dry-sand work to a large extent. Equipment installed in this section

FIG. 13.—*Pouring in progress in the semi-mechanized section, from covered ladles carried from an overhead runway (Stothert & Pitt, Limited).*

consists of two Morgan tilting furnaces, one of 600 and one of 400-lb. capacity, respectively, a small lift-out furnace being available for melts up to 60 lb. All these three furnaces are gas fired.

Variety in size, shape, complexity and composition of products is the keynote of Stothert & Pitt's foundry organization which produces castings for such varied purposes as cranes, concrete-mixer pumps and vibrating rollers.

Westinghouse Brake & Signal Company, Limited

The works of Westinghouse Brake & Signal Company, Limited, at Chippenham, are very extensive and occupy an area of approximately 20 acres. The original works were built in 1895 and have grown by expansion of business and the gradual amalgamation of a number of pioneer firms in the manufacture of railway brake and signalling apparatus. The factory produces a wide range of intricate products, such as air and vacuum railway brakes of all types; mechanical, electrical and electro-pneumatic signalling of every description; air and vacuum brakes for road vehicles; steam-heating equipment for railways; pneumatic appliances for safe and rapid handling of colliery tubs; metal rectifiers for conversion of alternating current to direct current; and other electrical equipment.

Foundries

The foundry organization covers 74,000 sq. ft., comprising patternshops and stores, coreshop, iron, non-ferrous and light-alloy foundries and a die-casting foundry.

In the iron foundry, chief items of plant of interest to the visitors are the jolt/squeeze and jolt/rollover moulding machines capable of handling 3,000-lb. moulds; three cupolas, two of 36-in. dia. and one of 30-in. dia.; a mechanized sand plant; Prosamas and gyratory riddles. In the non-ferrous section there are jolt/squeeze moulding machines for moulds 15 by 4 by 6 in.; an August-Simpson sand mill for facing, fed from the main sand plant; four 450-lb. tilting crucible furnaces and two of 1,000-lb. capacity; and there are the usual facilities in both the iron and non-ferrous foundries for grinding, chipping and shotblasting. Some while ago the manufacture of spheroidal-graphite castings led to the purchasing of an electric indirect-arc rocking furnace of 1,000-lb. capacity.

The chief items in the die-casting foundry are as follow: Seven pressure-die-casting machines, including two large machines capable of casting 164 sq. in., and a gravity-die-casting section; eight bale-out crucible furnaces of 150-lb. and 300-lb. capacity, gas-fired; and one 350-lb. rotary furnace for bulk melting. There is the usual machinery connected with die-casting, such as backstand grinders, band-saw, power presses and a vapour-blast machine.

Special attention in the shell-moulding section is drawn to the method of making aluminium patterns and coreboxes by the pressure-cast plaster process (pioneered by their Mr. D. Potts); shell moulding using this type of pattern, and s.-g. iron castings produced from shell-moulds.

Electro-heat Meeting

The *Union Internationale d'Electrothermie* (UIE) held the annual meeting of its executive committee this year from April 24 to 27 at the offices of the Electricity Council, Winsley Street, London, W.1. The UIE which was formed at the conclusion of an International Congress of Electro-heat in Paris in 1953, now has a membership of 14 countries. The UK member is the British National Committee on Electroheat—the secretariat of which is provided by the British Electrical Development Association. The aim of UIE is to establish permanent liaison between member countries on all matters connected with the industrial application of electro-heat but excluding matters of purely commercial aspect. Its secretariat is in Paris and its affairs are managed by the executive committee, comprising two permanent representatives from each country.

At this year's executive committee meeting, the first two days were devoted to technical sessions. On the Wednesday delegates and their ladies were guests of the Midlands Electricity Board for a motor-coach tour of part of the Midlands, the delegates, in the afternoon, paying a visit to the works of Garringtons, Limited, at Bromsgrove, and the ladies having their own separate tour. The meeting officially terminated with a dinner at Oxford on the Wednesday evening, but a supplementary visit was arranged to Hinckley Point nuclear power-station for which some of the delegates stayed on until the Thursday.

In addition to that provided by the Midlands Electricity Board, hospitality was also provided by the Electricity Council, three electro-heat sections of BEAMA, the London Electricity Board, the Central Electricity Generating Board and the British National Committee on Electroheat. The next congress will be held in Wiesbaden, Germany, in the autumn of 1963.

Hills New Die-casting Foundry

Factory and Office Extensions at the premises of Hills Precision Die Castings Limited, Hall Green, Birmingham.

Hills Precision Die Castings, Limited, with its pressure-die-casting, machining, polishing and plating facilities, is a fully self-contained unit which began in a very small way soon after the first world war and grew progressively during the ensuing years. More recently, however, opportunity has been taken to extend the nature of the products and the industries which it serves. To meet the greater demands, production facilities have been increased, the most recent additions being in the form of a factory extension and a new office-block, just completed. To celebrate this event, the firm arranged an official opening on May 3, when the Rt. Hon. Aubrey Jones, M.P., performed the ceremony. This was followed by a conducted tour of the works of which the following article records the salient features.

The compact factory of Hills Precision Die Castings, Limited, inspected on May 3, represents the culmination of five progressive years in the company's history. From small beginnings in Darwin Street, Birmingham, of the parent concern (Charles Hill & Company, Limited) over 40 years ago—when the products were limited to a range of metal fittings for the funeral trade—the group has now consolidated its entry into the country's pressure die-casting industry. The widening range of products now includes considerable numbers of fully finished, polished and plated components for engineering and domestic equipment, and particularly for the motor trade, with which the company has close connections. The original company still maintains a leading rôle in the funeral furnishing business.

Thus, to be seen during the tour of the plant was the production of polished and chrome-plated refrigerator door-handles, gas-lighter-pistol components, parts for paint-spray guns and oil-cans, motor-car door-handles, badges, headlamp bezels and other motor "trim" components. All these were being manufactured side by side with coffin-handles and other funeral fittings. Nowadays, about 400 are employed in these works.

New Layout

Employing modern techniques of production, the plant and facilities are constantly under review to ensure maximum efficiency. Considerable importance has been attached to plant layout and it was the obvious advantage to be gained by re-grouping all production facilities under one roof that inspired the design and construction of the new extensions. These extensions have been planned with the objective not only of providing additional production space and new warehousing facilities, but also to enable re-siting of various departments in a more convenient and efficient manner, as shown in Fig. 1. In order to achieve maximum benefits from space available, the designing and drawing offices, production planning and control departments, methods- and work-study departments have all been raised to first-floor level to release a further 3,500 sq. ft. of production space in the works. These new offices provide bright and comfortable working conditions for the personnel involved. Flush-fitting convector-heaters, almost over-generous windows fitted with venetian blinds), a thermally-insulated suspended ceiling and thick vinyl-tiled flooring have been incorporated to this end. Lattice girders spanning some 72 ft. dispense with the need for supporting columns and so leave the workshop floor beneath unimpeded. In addition, service departments and other offices have been removed from the central area of the plant and new accommodation has been built for them on the perimeter of the building. These include offices for shop-floor managers, the personnel officer, and also a well-equipped laboratory and a surgery.

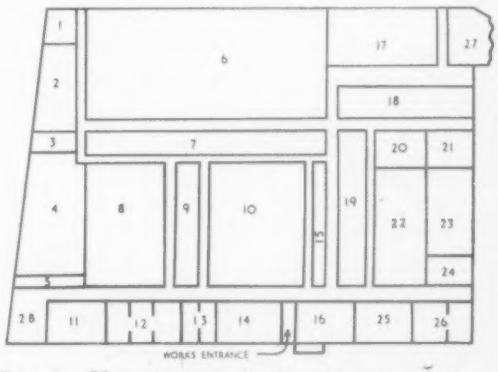


FIG. 1.—*Plan view of the foundry of Hills Precision Die Castings, Limited, at Hall Green, Birmingham.* (*Key to Fig. 1 below.*)

(1) Die stores, (2) compressor house, (3) tool stores, (4) tool-room, (5) male cloakroom and toilets, (6) zinc-base casting shop, (7) work bank, (8) machine-shop, (9) polishing shop, (10) plating shop, (11) boiler house, (12) barrelling and jig manufacture, (13) laboratory, (14) racking section, (15) "post-plate" viewing, (16) offices and surgery, (17) aluminium casting shop, (18) general stores, (19) assembly, (20) paint shop, (21) vacuum plating shop, (22), packing, (23) warehouse, (24) despatch, (25) office entrance hall, (26) female cloakrooms, (27)maintenance dept., (stores adjoining), and garages, (28) male toilets.

FIG. 2.—*A bright new entrance hall, with colourful modern styling and comfortable chairs make a visitor feel welcome. (Other founders please copy! —Editor.)*

Careful attention has been paid to ensuring comfortable working conditions by the provision of remote-controlled louvred ventilators to allow rising heat to clear quickly. Additional air can be introduced into the workshops through powered ventilation units which are provided with heater batteries connected to steam mains, so that incoming air can be adequately warmed. The importance of a pleasant reception to visitors has not been overlooked. The new entrance hall (Fig. 2) has been built partly into the structure of the original building and the colourful modern styling with the large plate-glass windows and armour-plate glass entrance-doors present an attractive first-impression to the ever-welcome visitor.

Objectives

Apart from the obvious advantages to be gained from the new extensions in terms of production efficiency, comfort and well-being of visitors and workers alike, there is another vital reason behind them, the faith which the company has in the future of the die-casting industry. The advantages of pressure-die-casting both in zinc- and aluminium-based alloys, are being recognized more fully every year. More and more manufacturers are realizing that by carefully designing components to utilize these advantages to the utmost extent, pressure-die-casting offers a method of manufacture difficult to match; it can produce prodigious quantities of accurately-made, often complex, components in a relatively short time at highly economic prices. Technological development within the industry proceeds apace and it is the constant endeavour of the die-casting engineers at Hills to absorb the practical aspects of all such advantages into the regular production facilities.

The company has also recognized the prime importance of supplying die-castings fully finished by machining operations where necessary, by polishing, plating, painting, vacuum coating and even sub-assemblies made up from several die-cast components, and particular attention is also given to technical development in each of these finishing departments. Finally, rigorous inspection throughout the plant has been established to ensure that a high standard of quality can be maintained. With the improved facilities now at their disposal, Hills are ready to tackle and encourage the new opportunities which the engineering industries can offer and look forward to even greater expansion in the future.

Die-casting Shop

The die-casting area of the factory, comprising approximately 8,500 sq. ft., is grouped together at one side and contains three Madison Kipp casting machines, two EMB machines and seven Schultz machines, all casting Mazak III alloy. A section of this area is devoted to the manufacture of aluminium-alloy castings, which are produced on three Herbert Reed-Prentice machines, and the new extensions have provided space for the inclusion of a further "aluminium" machine. Lead casting is carried out at a separate factory some two or three miles away in order to avoid the danger of contamination of Mazak with lead. The alloys in current production include aluminium alloys LM 2, LM 6 and LM 24.

Interesting features of the die-casting machines are the extensive use which is being made of four and two unit die-blocks in which each unit may carry any of a number of different individual die impressions. Use of this system enables the time occupied by tool changes to be reduced very considerably and also helps materially in improving the economics of relatively short-run requirements. A further feature of the casting shop designed to improve the overall economics of production is the extensive use of the cast/clip arrangement (Fig. 3). Clipping presses are situated so conveniently near to the casting machines that it is practicable for the operators to place the spray of castings from a casting machine directly into a press during the normal cycling time. "Tooling" of the clipping press can also be made up on a unit principle corresponding to that of the die-casting machine. This again enables considerable savings to be made on the time spent in tool changes.

All the die-casting machines are operated on automatic or semi-automatic cycling, and the progress of their operation is recorded electrically on a Centralograph recorder, making possible a detailed examination of their operation and an analysis of any "down" time.

Work Bank

Clipped castings from the die-casting area are fed into a "workbank" where they are stored in pallets adjacent to the casting-shop area. (It is found more convenient and economic to manufacture castings in reasonable production quantities from the die-casting machines, and store them in this bank, from which they can be subsequently drawn for finishing operations to meet customers' scheduled requirements.) Quantities of castings withdrawn from this workbank to produce cus-

tomers' weekly requirements are fed through into the finishing lines comprising machine-shop, polishing shop, plating, painting, assembly, packing and despatch.

Machine-shop

The machine-shop equipment ranges from hand presses, bench drillers, *etc.*, to automatic special-purpose machines, the majority of which have been designed by the company to provide fast economic production of large quantities of components. Extensive use is made of plastic nests to hold castings during machining operations and sliding fixtures for multiple-stud running. Two special-purpose machines are of particular interest—one is for drilling four holes in a handle component and broaching a square bore within six seconds, including loading and unloading, and the other automatically drills and taps five holes in a complex casting in an overall time of nine seconds (Fig. 3).

Other Departments

Polishing Shop

Adjoining the machine-shop is the polishing shop (Fig. 4) containing 13 polishing lathes and three backstand idlers. The noteworthy feature of this shop is the extreme cleanliness achieved by a remarkably efficient dust-extraction system, this being essential as the polishing shop adjoins the plating shop, with no intermediary walling.

Racking Section

On completion of the polishing operations, castings which have to move forward for subsequent plating must first be mounted on jigs, and the majority of these have been designed and built specially for the individual components currently in production.

Plating Shop

The plating-shop facilities provide for plating copper (both bright and Pochelle), bright nickel, chromium, brass, silver and gold. Castings already mounted on jigs from the racking section are fed through the plating lines under careful control of the nearby laboratory, which maintains a constant check on the quality and thickness of the plating. The latter determination is now made on a recently-installed BNF Coulometric thickness-gauge which records the thickness of a plated coating within a few minutes, and with an accuracy comparable

FIG. 3.—*Layout for the production of complex motor "trim" components, comprising casting machine, clipping tool, band grinding, inspection, drilling and tapping of five holes on a special-purpose machine. It is believed that this set-up—with the caster removing runners, flash, etc., during casting solidification time—is unique in British pressure-die-casting.*

FIG. 4.—*View of the polishing shop of Hills Precision Die Castings, Limited. Note the elevated position of the rectifiers in the background, thus leaving floor-space clear beneath.*

with that achieved by physical measurement of a micro-section.

Removal from Racks

At the end of the plating lines are the drying cupboards from which the jigs of plated castings are removed, the castings themselves detached and placed in trays ready for final assembly operations, or if complete in themselves, for packing. The empty jigs are then returned to the racking section.

Assembly

The assembly line comprises of a number of operators each provided with special equipment together with the various component parts. After assembly, items are then placed on the conveyor belt taking them to the wrappers and packers at the end of the line. Extensive use is made of jigs and fixtures to enable rapid assembly, and air-driven tools and vibratory-feed systems are also employed. The assembly operations at any point can be rapidly changed to enable production of a wide variety of different components to be handled simultaneously. It is noteworthy that the new extensions, providing as they do additional work area of this end of the factory, have enabled the company to extend their assembly lines and provides far more adequate space than hitherto for packing and despatch.

Packing and Despatch

In view of the fluctuations in demand which occur with the majority of products in regular production, it is normal practice to hold in stock within the warehouse area a minimum of two weeks' requirements of all components. The warehouse itself is housed completely within the new construction. The practice of manufacturing for stock gives the company adequate facilities for meeting sudden emergency demands for additional quantities, without the necessity for waiting whilst they are put through the production processes.

Paint Shop

As many components are required either fully painted or—as in the case of certain bonnet motifs or handles—painted in part on a chrome-plated finish, facilities have been provided within the new extensions for carrying out this operation. Previously the paint spray-booths had been installed in a separate building which has been found inconvenient to operate; the new premises now enable all finishing operations to be carried out under one roof. A newly-installed conveyor-type drying oven gives accurate control of drying and stoving temperatures and within the same area are also housed two machines for vacuum deposition (aluminizing) of metal or plastic components.

Services

It will be noted from Fig. 1 that service facilities have been disposed around the perimeter of the production area in order to leave the central area free for production. The toolroom is well equipped with the latest surface and universal grinding machines, copy milling machines, precision lathes, a shaper equipped with a 2.D copying device, heat-treatment facilities and aquablast equipment.

The laboratory is conveniently placed near to the plating section and is well equipped for qualitative control of all processes. Periodic checks are taken at regular intervals through the day to ensure that a high standard is constantly maintained. A new, modern, and well-equipped surgery has been provided during the course of the recent construction in a part of the original building.

In addition to the above, offices for the personnel department and for the shop-floor supervisory staff have also been provided in areas of the original building previously occupied by the clerical staff. In the new building there is also a packing section dealing primarily with items of coffin furniture for export shipment and, at the end adjacent to the casting shop, the general materials stores has been extended. At the furthermost end of the new extensions are also situated conveniently the workshops for the maintenance of cars and vehicles. Outside the new buildings is a wide area to enable easy entry and exit of vehicles approaching the despatch and inwards-goods entrances, in addition to an adequate employees' car park.

Luncheon

After the tour of the various departments of the works, visitors were entertained to luncheon at which Mr. Aubrey Jones was the chief guest. At this juncture, thanks were expressed to the directors of the company and appreciation was voiced on the meticulous timing of the tour and the value of dividing the visitors into quite small groups of four to five people.

News in Brief

THE FORFEIT FEAST of the Cutlers' Company will be held earlier this year. Instead of the customary date in late September, it will be held on June 6, before the summer-holiday period. The new date has been decided upon because it is convenient for the Lord Mayor of London, Sir Bernard Waley-Cohen, who is to attend with the Lady Mayoress, Lady Waley-Cohen, and it eases pressure on the Cutlers' Hall staff associated with the installation of the new Master Cutler in the autumn.

EMPLOYEES AND GUESTS, numbering 1,200, attended the first of two staff dances of James Neill & Company, Limited, Napier Street, Sheffield, at the Cutlers' Hall, Sheffield, on April 14. Among those present were Sir Frederick Neill and other directors of the firm, and directors of the Hallamshire Steel Company, Limited, a subsidiary company. Departments represented were the general engineering, tool and hacksaw. A second staff dance was held last month, for members of the magnet, steel and file departments.

H.R.H. THE DUKE OF EDINBURGH is to visit Sheffield and Rotherham on July 19. At Rotherham he will open the £600,000 extension to the College of Technology. At Sheffield buildings to be officially opened by the Duke are the new Department of Fuel Technology, completed last year; extensions to the Chemistry Department on Western Bank; and the Hicks Buildings for the Physics Department, recently completed. At a lunch at Sheffield University, the Chancellor, the Right Hon. R. A. Butler, will be present.

FOLLOWING DEVELOPMENT OF THE COMPANY under specific departments, Boot & Lancaster, Limited, Old Wharf, Wolverhampton Street, Walsall, announce further reorganization of their premises. On May 1 office staff concerned with foundry sand were moved to new accommodation and correspondence for this department should now be addressed to Boot & Lancaster, Limited, Foundry Sand Merchants, Minerva Wharf, Horseley Fields, Wolverhampton. Mr. F. E. S. Morris will be in charge of the office of this department assisted by Mrs. Potter.

DUE TO THE REDEVELOPMENT of the Brunswick Street area the Reay Brass Foundry Company, Limited, of West Row, Stockton, is moving its premises to a new 16,000-sq. ft. main factory being built on a three-acre site in Portrack Road, Stockton. The foundry building, despatch bay and machine-shops will cover a frontage of 200 ft. with a depth of 105 ft., and provision is also being made for a welfare block and canteen, showers and individual lockers for employees and an office block and patternstore. Room is available on the site for the floor area to be doubled should future expansion call for this. Completion of the factory is scheduled for July.

NEWTON CHAMBERS & COMPANY, LIMITED, Thorncliffe, Sheffield, have entered into an exclusive agreement with John Mohr and Sons, of Chicago, Illinois, USA, for the sale, manufacture and installation in the United Kingdom and parts of the Commonwealth, of blast-furnaces, complete with all ancillary equipment, to the latest designs of the Mohr company. The Mohr Company, which has been in this field since 1857, is one of the leading designers and constructors of blast-furnaces and steelworks equipment in America. The agreement was finalized by Mr. P. J. C. Bovill, managing director, Newton Chambers & Company, on a recent visit to the United States.

BROOK MOTORS, LIMITED, report that a West German customer has increased a repeating order for stator/rotor units by 25 per cent. The firm has also received an order from West Germany for 1,000 dish-washing machine motors, which are manufactured at the Barnsley works. Other recent orders from overseas received by the firm include 75 motors from five to 250 h.p., making a £10,000 order for a paper mill project in Holland. There is also an order for 1,100 fractional h.p. flange motors for use on oil-burning heater-appliances from Sweden. The United Arab Republic has ordered 150 motors ranging from 0.5 to 40 h.p. for use on the Aswan High Dam project.

REPRESENTATIVES of the Japanese steel industry have told Mr. Ian Fleming, leader of the South African trade mission to the Far East, that Japanese steel mills would continue to import substantial amounts of pig-iron from South Africa in the next few years, according to a spokesman for a Yawata Iron and Steel Company in Tokyo. Japan imported about 180,000 tons of pig-iron from South Africa last year. Import requirements this year were estimated at 1,000,000 tons. The spokesman added that the Japanese steel industry was also taking a continued interest in South African manganese and chrome ore. Last year, too, Japan imported some 270,000 tons of South African iron ore.

NEW PLANT, costing more than £250,000, to be installed under a proposed development by the Scottish Stamping & Engineering Company, Limited, Ayr, will, it is reported, eliminate grit and smoke. A street is to be demolished and tenants rehoused by the town council to make way for a series of one-storey buildings comprising the new plant. The firm, part of the Guest Keen & Nettlefolds group of companies, has spent thousands of pounds trying to solve the problem of grit and smoke, and has now decided to cut out steam as the motive power for the stamping hammers and install a compressed-air system of operation. The new system is due to be in operation by July of next year.

HOLMAN BROTHERS, LIMITED, who with their subsidiary company Climax Rock Drill & Engineering Company, Limited, have supplied mining and civil engineering equipment to Russia over a number of years, will be despatching a wide range of their equipment for display at the British Trade Fair to be held in Moscow from May 19 to June 4. Amongst exhibits on the company's stand (D.252) will be a Holman Holtrac crawler-mounted drill rig, rockdrills, including the Dryductor rock drill, and an ejector-type self priming sludge pump. The company is also displaying its Rotair 370 portable rotary-screw compressor, and this will be the first occasion on which a Rotair has been exhibited in Russia.

PLANS HAVE BEEN SUGGESTED for a merger between the Indonesian Service Company and Gaya Motors to establish a motor-assembly plant in order to promote the country's car industry. The director of the ISC said that the two companies would provide 60 per cent. of the Rp. 300 million capital required, and other companies 40 per cent. He said it was not yet known whether the plant would operate under the licence of a foreign company or would produce its own vehicles, but he made it clear that he favoured the latter course. He added that ISC's assembly plant for Willys jeeps, Dodge trucks, and Ford cars had been considerably extended, and that several officials had been sent abroad to increase their technical knowledge.

MR. W. ALAN JENKINS, who was re-elected as president of Rotherham Chamber of Commerce at their annual meeting last month, told members of his regret at the absence of a direct export incentive in the

News in Brief

Budget. He said that the Prime Minister had told business men that exports were "fun," and no doubt, said Mr. Jenkins, a successful export business could be a happy affair, but there were many aches and problems about it. While there might not be great scope for exports from the Rotherham area, and despite the fact that the recent Budget had not give any direct incentive to that end, he hoped members would examine the position afresh. He stated that Rotherham's unemployment figure was probably less than 1.2 per cent. against the national level of 1.5 per cent.

SOME SHEFFIELD EMPLOYERS are criticised in the ninth annual report of the Sheffield City Youth Employment Service for not arranging planned intake to coincide with school-leaving periods. It states that some are "even surprised at the lack of juvenile labour at mid-term." It says, "Sometimes notifications of vacancies are unnecessarily delayed, with the result that boys and girls who might have been eminently suitable have already been placed elsewhere in posts which may be less attractive but which they cannot easily change." So far there has been no shrinkage in the number of jobs available for youth in Sheffield. "On the contrary, the demand for young workers is much higher than anticipated, and as far as can be seen, this favourable position seems likely to continue."

A LARGE FACTORY which is being taken over by Rolls-Royce, Limited, at Hamilton, will be staffed by highly-skilled tradesmen and top-level technicians. Design, development, and experimental work in Scotland will be concentrated at the plant and it will give employment to about 500. Of these 250 are drawn from other Rolls-Royce works and 250 new jobs will be available for men with the necessary skills. The Hamilton (Lanarkshire) factory was formerly occupied by Standard MacLean, Limited. Another project of the company is a new building, to house about 2,000 people, to be built at Sinfin, Derby. It will include engineering and main office accommodation, and is being sited next to the aero-engine facilities at Sinfin to enable the engineering departments to be grouped together.

THE PRESIDENT OF THE BOARD OF TRADE, Mr. Reginald Maudling, M.P., speaking at a Press conference held at the Swedish Embassy, London, last week, said that the British Trade Fair in Stockholm, to be held in 1962, had the full support of Her Majesty's Government. The Board of Trade would be taking a substantial amount of space for a display of British achievements. The UK, he said, was failing to make the most of its opportunities in the Swedish markets. British trade connections with Sweden had always been close and the trade in both directions very substantial. Recently the UK's share in Sweden's total imports had been declining, but now that both countries were members of EFTA and British goods were receiving increasing tariff advantages in Sweden this must be put right.

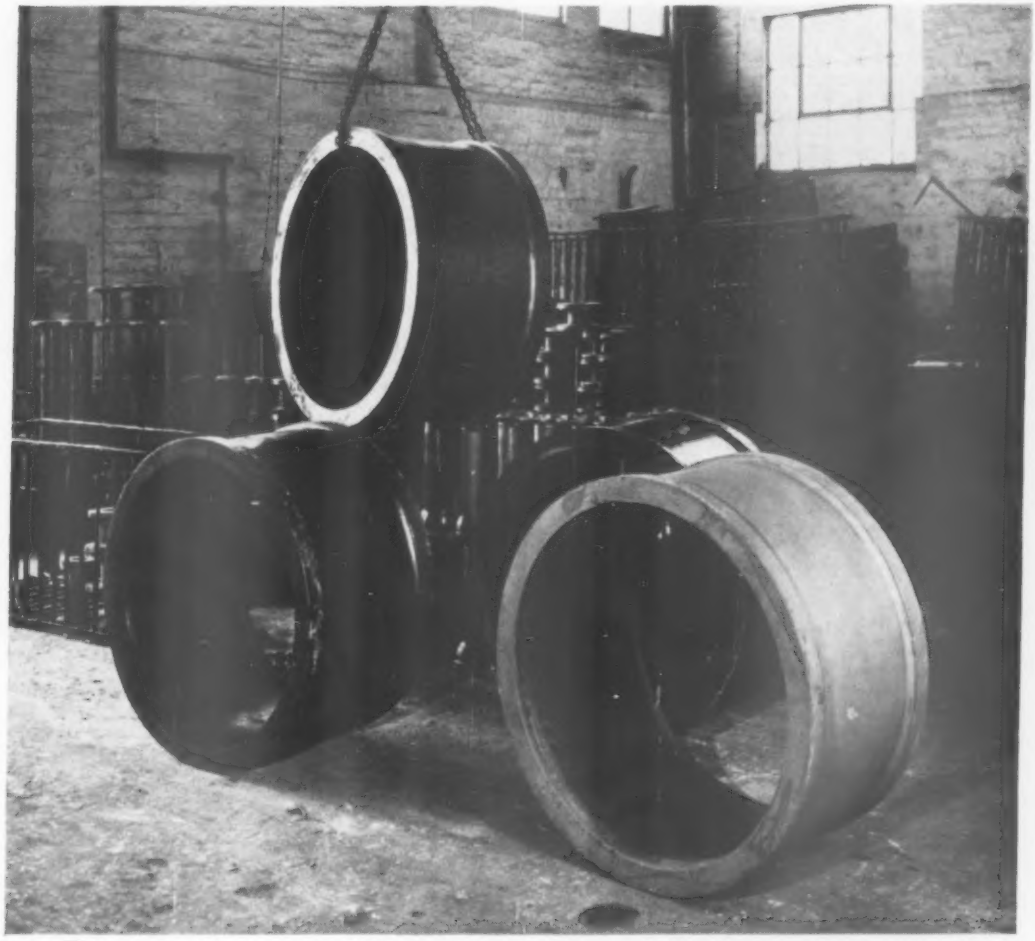
SHEFFIELD WORK will be featured at the pavilion of the Vickers group of companies at the British Trade Fair which opens in Moscow in May. The pavilion will be in the largest individual company pavilion in the grounds of Skolniki Park It will include four 17-ft high enlargements of pencil drawings by Terence Cuneo which he did in some of the Vickers works. Two 36-in. sq. panels of stainless steel from Firth Vickers will be shown on the opposite wall. There will be a photographic display of work produced by the English Steel Corporation, Limited, and Firth-Vickers will be showing a number of stainless-steel products, including castings. Another member of the group, George Mann & Company, Limited, lithographic printing machine manufacturers, of Leeds, will also have a photographic display.

Mr. E. J. (TED) HILL, chairman of the TUC, and general secretary of the United Society of Boiler Makers, who presented craft certificates at the annual apprentices dinner of Hadfields, Limited, Sheffield, declared that the youths of to-day were not "an irresponsible bunch of lads;" they were, in fact, no different from the youth of yesterday. He told the apprentices, "The more you achieve during your apprenticeship, the greater the results you will achieve later in life." Awards amounting to over £200 were presented. The two "best apprentices of the year" each received £20; over 40 apprentices qualified for certificates. Among those present at the dinner were Lord Dudley Gordon, chairman of the firm, and Mr. Harold Humphries, managing director. Before the dinner, Mr. Hill toured the works.

THE LARGEST oil-filled cable yet made by British Insulated Callender's Cables Limited, for commercial operation has been manufactured to the order of the Hydro Electric Power Commission of Ontario by BICC Power Cables Division, Erith Works, Belvedere, Kent. It is a single-core 230 kV. cable and the 2.16 sq. in. conductor consists of six stranded segments laid round a central oil-duct. The new cable will provide two three-phase circuits between Haig Junction and Applewood Junction in Toronto, each being designed for operation at 230 kv. with a rating of 540 mva. at 100 per cent. daily load factor and 680 mva. at 75 per cent. daily load factor with the adjacent circuit out of service. Laying of the cables will be direct in the ground without ducts and three, ¾-in. i.d., polyethylene waterpipes will be installed with each circuit for cooling purposes.

AT A DINNER of the Business Writers' Association of the Philippines recently President Garcia of the Philippines gave his backing to a programme of legislation, which, he said, is necessary as a prelude to full monetary decontrol. He explained that the channelling of economic activities into desired lines will have to be accomplished by inducement and moral persuasion rather than by edict. The President stressed "above all we have to pass a foreign-investment law really intended to attract friendly foreign capital to the country. We have to admit that our own capital formation, being small as yet, does not have the capacity and the courage to go into highly speculative ventures like oil mining, or ventures that require heavy initial investment and are very slow in producing profit, like iron, silver, nickel, basic metals mining, or any mining, for that matter."

AS A MEANS OF DEVELOPING EXPORTS to Europe, the Birmingham Chamber of Commerce is considering the establishment of group selling organizations, with the possibility of joint stock bases overseas. The proposal was explained to the Council of the Chamber by Mr. A. J. Adams, chairman of the recently formed Europe export section, of which leading Midland industrialists are members. He said that a special sub-committee has been formed to consider the question of training export personnel, and the cost of maintaining salesmen in Europe. Mr. Adams suggested that there should be additional teleprinter links between the UK and the Continent so that Midland manufacturers could give the same sort of service to a European customer as a German manufacturer does. The Europe export section of the Chamber is to produce a series of short reports giving information on exporting.



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SAMPLES AND FULL PARTICULARS GLADLY SENT ON REQUEST

Personal

Mr. J. C. SNOW, of Snow & Company, Limited, machine-tool manufacturers, Stanley Works, Sheffield, left with a party for West Germany under the auspices of the EXPORT Council on May 1. Mr. J. HUGH NEILL, a former Master Cutler and joint managing director, James Neill & Company (Sheffield), Limited, is also going with a small party under the Council's auspices to Greece.

Mr. F. W. GOODGE, a joint assistant managing director of Keith Blackman, Limited, London, N.17, is to become managing director of the company on June 1, in succession to Mr. D. S. WOODLEY, who is retiring from that position on May 31. Mr. Woodley will remain chairman and consultant to the company. Mr. C. J. ATKINS will become assistant managing director as from June 1.

Mr. F. P. S. STAMMERS is to become chairman in addition to his position as managing director of Radiation, Limited, in succession to Mr. W. DONALD KING, who is retiring after the company's annual general meeting on May 25, for health reasons. Mr. King will remain associated with the company in an advisory capacity. At his own request, Mr. E. J. PARKER remains vice-chairman.

Mr. S. W. MARTIN has relinquished his position as managing director of the Staveley Iron & Chemical Company, Limited, but continues as chairman. He is succeeded as managing director by Mr. N. C. MACDIARMID, a director of Stewarts and Lloyds, Limited, who joined the Staveley board in September, 1960. As already announced, Mr. W. N. Menzies-Wilson has been appointed deputy managing director from May 1.

The John Morris Memorial Award for 1961, offered by the British Industrial Truck Association, has been won by Mr. WILLIAM HOLLICK, senior engineer advising on mechanical-handling equipment at Unilever, Limited, for his paper on "The Design of Warehouse and Storage Areas to allow Efficient Handling by Industrial Trucks." As a result of the award, Mr. Hollick will attend the eighth annual material-handling course to be held at Lake Placid, New York, from June 18 to 30.

Mr. STANLEY PARNELL has been appointed deputy chief engineer of the Holman Group, Camborne, Cornwall. He joined the concern in 1929 and since 1958 has been in charge of the technical office of the Climax Works at Carn Brea. Mr. F. B. COOMBES, chief designer of compressors, hoists and pneumatic tools for Holman Brothers, Limited, Camborne, has been appointed general manager of the subsidiary company, Maxam Power, Limited. He succeeds Mr. WILLIAM G. BENNETT, who has retired.

The following members of the academic staff of the Borough Polytechnic, London, S.E.1, will be promoted as follow with effect from September 1:—Mr. D. R. J. HOLDSWORTH, lecturer in chemical engineering, to the rank of senior lecturer; Mr. H. F. D. LARTER, assistant lecturer in charge of dental technology to the rank of lecturer; Dr. J. A. SPEED, assistant lecturer in inorganic chemistry will become lecturer; Mr. S. N. RAY, senior lecturer in radio engineering will be principal lecturer, and Mr. J. F. HEWARD, will be promoted from lecturer in mechanical engineering to senior lecturer.

Mr. W. E. BARDGETT, research manager, United Steel Companies, Limited, Sheffield, will retire from that post on July 1, but will remain with the company as a consultant. Mr. Bardgett is the president of the Institution of Metallurgists this year, and was president of the Sheffield Metallurgical Association in 1941 and Sir Robert Hadfield Medallist in 1953. He was appointed to his present post with the United Steel Companies in 1946. He will be succeeded by Dr. K. J. IRVINE, deputy research manager of the United Steel Companies, who will be styled metallurgical research manager.

Mr. T. SANDERSON, deputy general manager and a director of the Workington Iron and Steel Company, has been appointed chairman of the Cumberland and Westmorland District Advisory Committee of the Northern Regional Board for Industry. An employer representative on the Committee for the past three years, he succeeds Mr. W. LEWIS, of Consett, a trade union representative. The new vice-chairman is Mr. C. H. BROMLEY, of Workington, branch chairman of the Iron and Steel Trades Confederation, and vice-president of the British Iron and Steel and Kindred Trades Association.

The Rt. Hon. Lord CLITHEROE, P.C., has been appointed a vice-chairman of Tube Investments, Limited. Sir BEN LOCKSPEISER, K.C.B., F.R.S., having reached retirement age, and Sir FRANCIS DE GUINGAND, K.B.E., C.B., have resigned from the board. Sir Francis is returning to the Union where he will continue to be in charge of TI's interests in Southern Africa. Dr. J. M. KAY, M.A., PH.D., at present Professor of Nuclear Power at the Imperial College of Science and Technology at the University of London, has been appointed to the board of Tube Investments as director of research and development from July 1.

Mr. J. C. DUGEON, London office director and manager, W. P. Butterfield (Engineers), Limited, Shipley, Yorkshire, retired at the end of April from active managerial work but remains on the board. Mr. D. F. BALAAM, London area technical representative, has been appointed London manager to succeed Mr. Dugeon, and Mr. D. J. FAIRBAIRN has succeeded Mr. Balaam from May 1. Miss B. HEAD, London postal-area representative for the galvanized tank and hollow-ware division, has been recalled to take up duties in the London office and is succeeded by Mr. B. WOOLMINGTON, who is now representative for the London area and Essex. Mr. J. LUMLEY has been appointed the division's representative in the Eastern counties in addition to his present responsibilities in the East Midlands. Mr. F. H. MALINSON is representative in the South-East including Kent.

English Steel Corporation, Limited, Sheffield, have announced the following appointments:—Mr. E. J. STREET, cost accountant, English Steel Forge & Engineering Corporation, Limited; Mr. T. HOLLOWOOD, cost accountant, English Steel Spring Corporation, Limited; Mr. F. R. BARNES, assistant accountant, Darlington Forge, Limited; Mr. R. VOLLUM, cost accountant, powers and comptometer offices, responsible for machine accounting, development and maintenance; Mr. T. W. HOLLAND, assistant cost accountant, operating companies, and personal assistant to the chief accountant, operating companies; and Mr. J. THORP, assistant cost accountant, operating companies, responsible for capital expenditure. English Steel Spring Corporation, Limited, have appointed Mr. J. P. HODGES as manager of the Grimesthorpe Spring Works. English Steel Rolling Mills Corporation, Limited, have made the following appointments at their Tinsley Park development:—Mr. J. B. MACHIN, works manager; Mr. R. B. SIMPSON, assistant works manager; Mr. E. PINDER, manager, steel melting department; Mr. E. SANDERSON, manager, blooming and billet mills; Mr. B. DYSON, manager, bar mills; and Mr. J. SWALLOW, maintenance

Electrical Aids in Industry *Data Sheet* **No. 18**

Factory Heating-1

The space heating of factories by electrical means can be achieved in a variety of ways which will be dealt with in the next Data Sheet.

Before deciding on any form of factory space heating—whether by means of electricity or not—it is as well to have clearly in mind all the components of the total annual running cost, and not merely the fuel cost, of the heating installation.

They are:

(A) The cost of the fuel or the electricity,

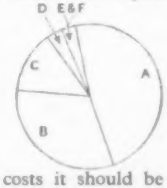
(B) Interest and depreciation on the capital cost of the installation,

(C) Labour,

(D) The cost of running auxiliary plant such as fans and pumps,

(E) Maintenance,

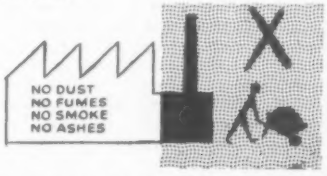
(F) Insurance.



In comparing fuel costs it should be borne in mind that electric heat is refined heat and has had all the fuss, bother, dirt, and cost of the conversion of fuel into heat taken out at the generating station.

In arriving at the true figures for capital cost and depreciation, maintenance and insurance, those connected with such items as boilerhouse, chimney, fuel store and access road should be included; labour costs should include such tasks as ash disposal. None of these items occurs when electricity is used, although space will be required for the electric boiler and storage vessels in the case of the type (h) in the next column.

Electricity provides the ideal answer to the requirements of the Clean Air Act, the impact of which has introduced an important new factor during the last few years.



The following list gives the main types into which electric heating installations fall:

(a) High temperature ("infra-red") overhead heaters operating at near red heat.

(b) Medium temperature panels operating at surface temperatures of 400° to 600°F.

(c) Extended surface heating in the shape of floorwarming operating at temperatures up to 80°F.

(d) Oil and water filled radiators.

(e) Tubular heaters.

(f) Unit heaters.

(g) Storage block heaters.

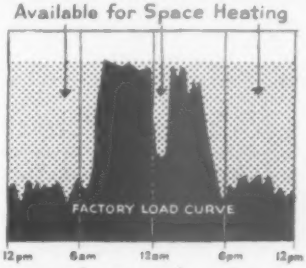
(h) Electric boilers and water heaters operating in conjunction with hot water radiators or panels either with or without water storage.

All these methods of electric heating can be divided into two distinct classes:

(a) Those that utilise electricity during "off-peak" hours and store the heat so generated for use at a later period.

(b) Those that use electricity whenever the heating system is in use (i.e. direct electric heaters).

The use of a heat storage system in a small works on a block tariff takes advantage of the lower tariff offered for an off-peak supply, and in the larger factory on a Maximum Demand tariff means that the heating load will not incur any M.D. charge. Alternatively



there may be cases where the use of direct electric heaters can be integrated with other factory loads in such a way that they are not used during the factory peak periods and will thus incur no additional M.D. charge.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. Tel: TEMple Bar 9434.

Excellent reference books on the industrial and commercial uses of electricity and reprints of articles and papers are available. An example is "Higher Industrial Production with Electricity" (price 8/6 each or 9/- post free).

E.D.A. also have available on free loan in the U.K. a series of films on the industrial uses of electricity. Film and Book catalogues and Publications List sent on request. 14279-4

CUT HERE

National Industrial Safety Conference

Accidents up by over 15,500 in 1960!

More than 1,000 delegates are expected to attend this year's National Industrial Safety Conference to be held at Scarborough from May 12 to 14. Organized by the Royal Society for the Prevention of Accidents, the main purpose of the conference is to improve the techniques of safety officers in their efforts to reduce accidents; Ministry of Labour figures recently announced show there were 15,591 more non-fatal accidents in 1960 than in 1959, whilst the figure of 665 fatalities in 1960 shows a rise of 67 deaths.

The conference begins at 8.30 p.m. on the Friday morning with the opening address by Sir Howard Roberts, RoSPA's president, and the first paper entitled "Safety begins in the Boardroom" will be given by Mr. G. H. Beeby, chairman of the British Titan Products Company, Limited.

On the Saturday morning, Mr. C. H. Craft, director of John Laing Construction, Limited, will speak on "Safety through Tidiness." He will be followed by Mr. E. L. Bird, technical research and education officer at the Building Centre, London, who will deal with "Structural Fire Protection in Factories." The afternoon will be devoted to discussions on a number of important issues. The final paper, on the Sunday morning, on "Safety with Solvents," by Mr. J. Howlett, general manager of the Hull Site of the Distillers Company, Limited, and a director of that company, will be read by a colleague, Mr. K. Lazenby, general services manager of the chemical division. The chairman of the technical sessions will be Mr. W. H. Harris, safety officer of Boots Pure Drug Company, Limited. This year's winner of the Sir George Earle Trophy is John Laing Construction, Limited, and during the conference the presentation will be made to the chairman of the company, Mr. W. Kirby Laing, by Sir Howard Roberts. The trophy is awarded annually by RoSPA to the firm or industrial organization making the most outstanding contribution to industrial safety during the preceding year.

In conjunction with the conference, a trade exhibition of industrial safety appliances will be staged at the Corner Café and Spa Ballroom, Scarborough.

Permanent Magnet Association's Lecture

The Permanent Magnet Association's bi-annual celebrity lecture was given in Sheffield on April 27 by Dr. Alun Edwards, of James Neill & Company (Sheffield), Limited. The firm sold its first permanent magnet on the day he joined the firm 25 years ago, and he has been closely associated with development and production of magnetic tools ever since. Dr. Edwards described stages of development in magnetic tools and design features that had been found to be important. He suggested ways in which tools, by simple adaptations, could be used at maximum efficiency on different kinds of work. The world's first successful permanent magnetic chuck was invented 27 years ago by Mr. W. L. Bower, chief designer of James Neill & Company (Sheffield), Limited, and it served to show that permanent magnet chucks would retain their magnetism. This was the foundation of the magnetic-tools industry, which now produces many types of holding devices not only for grinding, but for more arduous duties such as planing, milling and turning.

Dr. Dennis Hadfield, chairman of the Permanent Magnet Association Technical Committee, presided at the lecture.

NFCTC Progress

The National Foundry Craft Training Centre's report of progress during 1960 indicates that in the course of the year training was provided for 121 apprentices at the centre. The heavy intake of first-course apprentices in 1959 made it necessary for one second course to make use of facilities made available by the Stanton Ironworks Company, Limited—this addition made it possible to raise the number of apprentices under instruction to 132.

The Centre, which adjoins the foundry of Rudge Littley, Limited, at West Bromwich, offers extra training on a non-profit making basis for foundry apprentices, broadening the scope of the instruction they receive in their own works. The emphasis is practical, and the four-course syllabus includes a number of visits to different types of foundries; 28 such visits were arranged during 1960. The students are housed in a residential club, which provides opportunities for recreation, as well as for evening study. The club is regularly visited by members of the management committee, which is made up of foundrymen who are responsible to a body of trustees appointed nationally by the foundry industry.

The prize and diploma awarded by the Worshipful Company of Founders to the best student over the four courses in 1960, was won by Mr. Milosh Sekulitch of J. Hobkirk Sons & Company, Limited (Bedford). An item of major importance to the Centre during the year was the launching of an appeal to all sections of the foundry industry for donations towards a rebuilding fund. The trustees set their target at £100,000, which would be sufficient to provide a completely modern centre.

Visit to Yale & Towne

Many members of the national, trade and technical Press visited the Wednesfield plant of Yale & Towne Manufacturing Company on April 25. During the visit, three colour films were shown, featuring three items of equipment made by the company and these were shown in a number of widely-differing applications. Following a tour of the factory, visitors watched a demonstration through an "obstacle course" of the entire range of the company's equipment, from a small 1,000-lb. capacity hand truck up to the new 2 cu. yd., 12,000-lb. lifting capacity tractor shovel.

After the demonstration, Mr. John O. Sewell, managing director of the British divisions of Yale & Towne, spoke to the guests. He recalled that Yale began manufacturing materials-handling equipment in the USA in 1875 and that the company's international business was initiated more than 75 years' ago. Mr. Sewell said that in the past three years, the output of the materials-handling equipment industry had doubled and predicted that it would again double in the next four years; his company was currently exporting approximately 40 per cent. of its production, one third of that amount being dollar-earning. Concluding his short address, Mr. Sewell recalled that the Wednesfield plant, the visitors had toured, entered the earth-moving field in 1960 with the introduction of a 1½ cu. yd. tractor shovel, and approximately 80 per cent. of the production of this line was being exported.

"IRONMAKING AT STANTON," by E. M. Summers (director and general manager, iron production, Stanton Ironworks Company, Limited) has been reprinted from *The Stantonian*, in booklet form and is available to readers on request from the sales offices of the firm.

Baker Perkins Foundry Machinery at work ... *at the Southend Engineering Co. Ltd.*

This Baker Perkins Girojet Universal Shot Blasting Machine operates without compressed air, needs negligible maintenance and costs little to run. And here's another advantage—no foundations are needed. The Girojet will take an evenly distributed load of 500 lbs. Average shotblasting times: aluminium (2-4 minutes); grey iron (3-6 minutes); malleable cast iron or bronze (4.5-8 minutes); forged steel or stamped steel (10-20 minutes).

This is the machine that completely replaces the hand cabinet.

Please write for full details today.

Baker Perkins Ltd. ENGINEERS

Bedewell Division, Hebburn-on-Tyne, Co. Durham
Telephone: Jarrow 897124

HISTORICAL NOTE

Southend Engineering Company was established in 1901, and manufactured Marine and Stationary engines until 1914. The Firm has produced its own non-ferrous castings since 1938. They manufacture the "Viking 3" Outboard Motor, a set of flame guns for agricultural purposes, and a range of Stern Gear and fittings for marine engine manufacturers.

BP/F10

Raw Material Markets

Iron and Steel

The demand for castings from the ironfoundries is maintained at recent levels and enables most establishments to obtain reasonably good outputs, although in some instances, particularly in the case of the light and textile foundries, a much larger influx of orders is required to keep these plants working at capacity. For high-duty castings produced by the engineering and speciality foundries the call from many consumers is well sustained, and these foundries continue the most favourably employed.

The motor vehicle trade maintains a substantial demand, which enables foundries supplying the industry to obtain good outputs from a normal working week, and business at these levels appears to be assured for some time ahead. Large tonnages of high-duty castings are also being utilized by the heavy engineering and machine tool trades, power and electrical plant manufacturers, agricultural implement makers, the steelworks and other trades, and the overall demand for these castings is providing the foundries with sufficient work to enable them to show substantial outputs.

The same cannot be said of many of the light foundries supplying castings for the domestic utensil trades, from which business has been very erratic for some time past, and insufficient to keep plants employed anywhere near capacity levels. This position also applies to many of the textile foundries. From the building trade, demand for light castings remains at a reasonably good level, and although the jobbing foundries are fairly well employed, more work could be undertaken.

There is no scarcity in the supply of pig-iron to the ironfoundries, and in event of their requiring increased tonnages producing furnaces would have no difficulty in meeting these demands. The engineering and speciality foundries continue to absorb substantial quantities of the low-phosphorus irons, hematite, and, to a lesser extent, the refined pig-irons. Makers of high-phosphorus pig-iron are sending reasonably good tonnages to the light, jobbing, textile and some of the engineering foundries. Most producers of pig-iron have tonnages to spare, and as deliveries can be made promptly from stock or current outputs, the need for forward buying does not arise.

A scarcity of heavy cast-iron and machinery scrap continues, and some foundries have difficulty in covering for their needs. Foundry coke continues to be delivered in satisfactory tonnages, and ganister, limestone, and firebricks can be obtained to requirements.

The re-rollers are able to obtain all the steel semis they require, although the supply of carbon and alloy steels are not as plentiful as the mild steels. Many of the re-rollers hold good stocks of the latter, and on this account are unable to take up the full quantities which are being offered by home steelworks. Present demand for the products of the re-rollers, apart from reinforcing rods and bars, is well below former levels, and more work will be needed to keep plants fully employed.

Non-ferrous Metals

Copper has taken on a new lease of life on both sides of the Atlantic. The continuing unrest in the Congo has made sellers reserved and with demand steady and at times strong, the London quotation reached its highest point since last August. One bullish factor has been the figures for March which showed that UK consumption of copper was the highest since last November. Another factor has been the additional weight of demand from the Continent, Japan, and the United States. More important, however, is the continuing firmness of the market in New York which raised its price by one cent to 30 cents a pound. In fact it now appears that the combination of cutbacks in production, increased demand in the US, and heavy Japanese buying has resulted in a temporary shortage of copper.

The outlook is good and if US consumer demand continues at its present level, a further rise in the US price is likely. London is now taking its cue from the New York market so that the quotation here should also continue its upward trend, although at a slower pace.

Tin is a strong market in London, Singapore, and New York. The tight statistical position which has persisted in this metal for some months has now been reflected in falling London warehouse stocks, a continuing rise in the Eastern price and a narrowing of the gap on metal for quick delivery. The present surge of activity was triggered by reports of continued decline in world production. In the face of good, steady demand there is little hope that the Buffer Stock Manager will be able to stop the price from continuing to rise to higher levels.

Lead continues dull, but there is sufficient demand to enable the price level to be held fairly steady around £68 a ton. In the US the market is improving and the price is unchanged at 11½ cents a pound.

Zinc is a good market in London, but supplies are more than adequate and the price is fluctuating narrowly around £84 a ton. In the US the market is better and the quotation unaltered at 11 cents a pound.

"Look Before You Leap!"

A case before Bradford City Court concerning an engineering firm employing 24 people who had moved into premises without notifying the local Factory Inspector, serves as a warning to owners of small factories moving to new premises in Bradford because of demolition. Automatic Components (Stanningley), Limited, were summoned under the Factories Act of 1848 that "they having previously begun to occupy a factory at Horton Mills, Bradford, continuing to occupy the factory before being entitled to do so on each day between November 14, 1960, and April 13, 1961." The firm was fined £10.

The warning was given by the factory inspector, Mr. W. D. Ford, who presented the case. He said: "There are many small factories moving about Bradford, a position accentuated by demolition, and we are losing track of them. It is important that we see the premises they are moving into so that we can inspect conditions. When it is remembered what heavy penalties they can make themselves liable to they should make sure what the Regulations are." He said the Regulations required factory owners to notify the Inspector of Factories one month in advance of a move into new premises.

Automatic Components moved into Horton Mills, Mussleborough Street, Bradford, in April last year and they were visited by inspectors on April 13 last, but only half that period had been included in the summons. Mr. Barrington Black, who pleaded "Guilty" on behalf of the firm, said they were new in business and had acted entirely through ignorance. A director had visited the Town Planning Department at Bradford Town Hall and had been told it was all right to start a light engineering works in what had been a weaving shed. Imposing the fine the chairman, Mr. G. Eric Scott, said it was obviously the type of case where publicity might be useful.

WHATEVER YOUR POSITION

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Benefit by asking Richards to advise on your problems

FOUNDRY PLANT BY **Richards**

Richards Structural Steel Co. Ltd · Phoenix Iron Works · Leicester

ENGINEERS WITH OVER 100 YEARS FOUNDRY EXPERIENCE

Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated)

May 10, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d. South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si. £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 9s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 12s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free £275 0s. 0d.; 96/98 per cent., £285 0s.0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t.s. 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4 s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £241 15s. 0d. to £242 0s. 0d.; three months, £242 15s. 0d. to £243 0s. 0d.; settlement, £242 0s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 256s. 0d. per cwt. basis; 20 s.w.g., 291s. 0d. per cwt.

Tin.—Cash, £861 10s. 0d. to £862 0s. 0d.; three months £865 10s. 0d. to £866 0s. 0d.; settlement, £862 0s. 0d.

Lead (Refined Pig).—First half May, £67 12s. 6d. to £67 15s. 0d.; first half August, £68 17s. 6d. to £69 0s. 0d.; settlement, £67 15s. 0d.

Zinc.—First half May, £82 17s. 6d. to £83 2s. 6d.; first half August, £83 2s. 6d. to £83 5s. 0d.; settlement, £83 2s. 6d.

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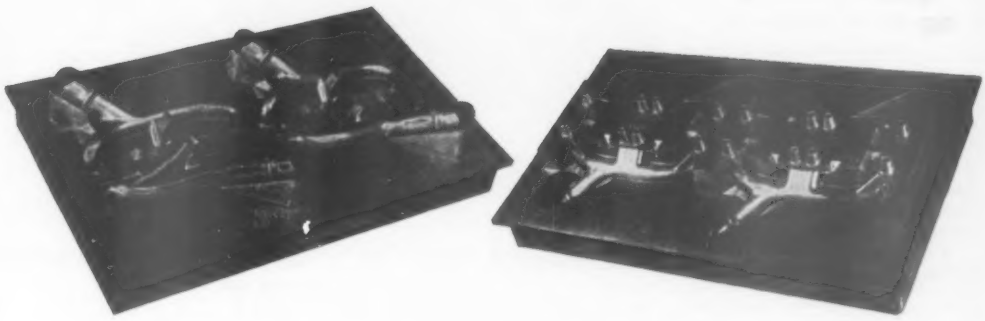

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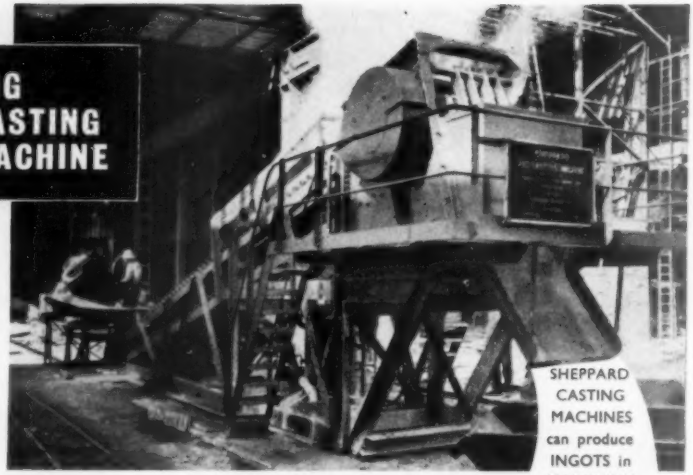

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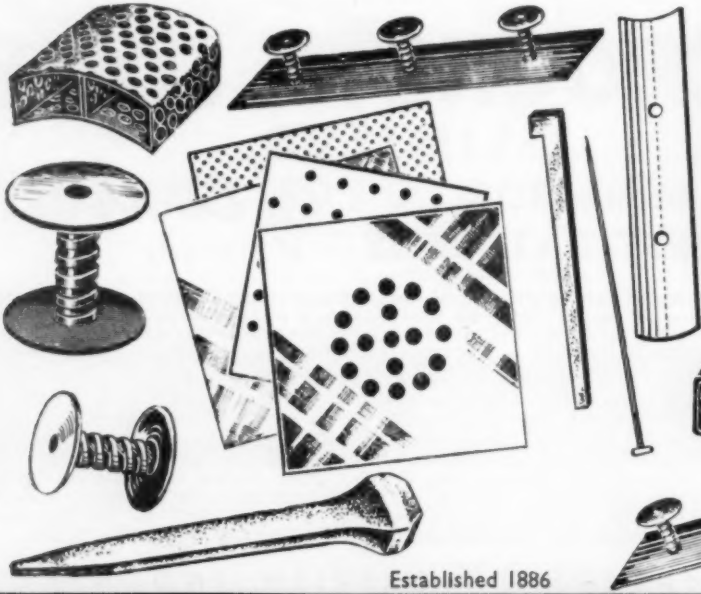

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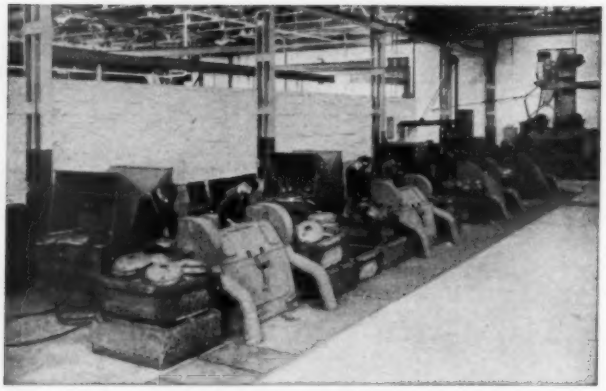

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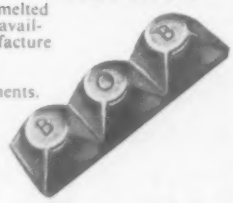

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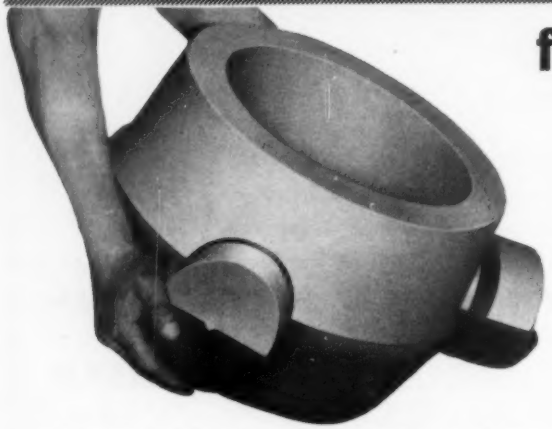

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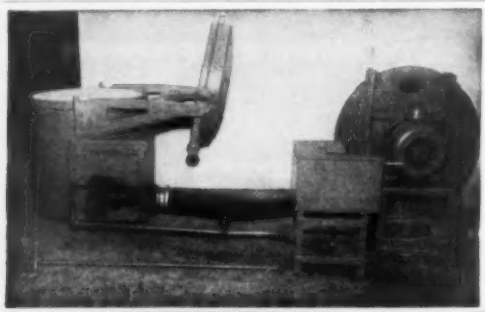

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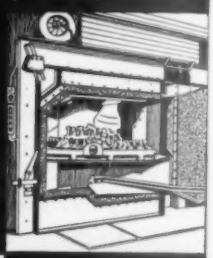

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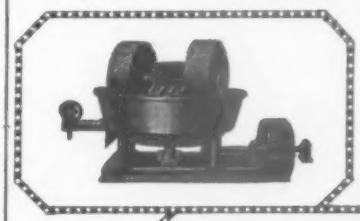

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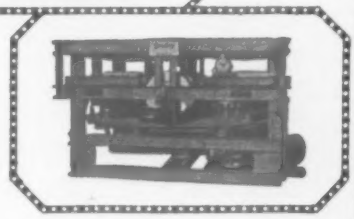

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